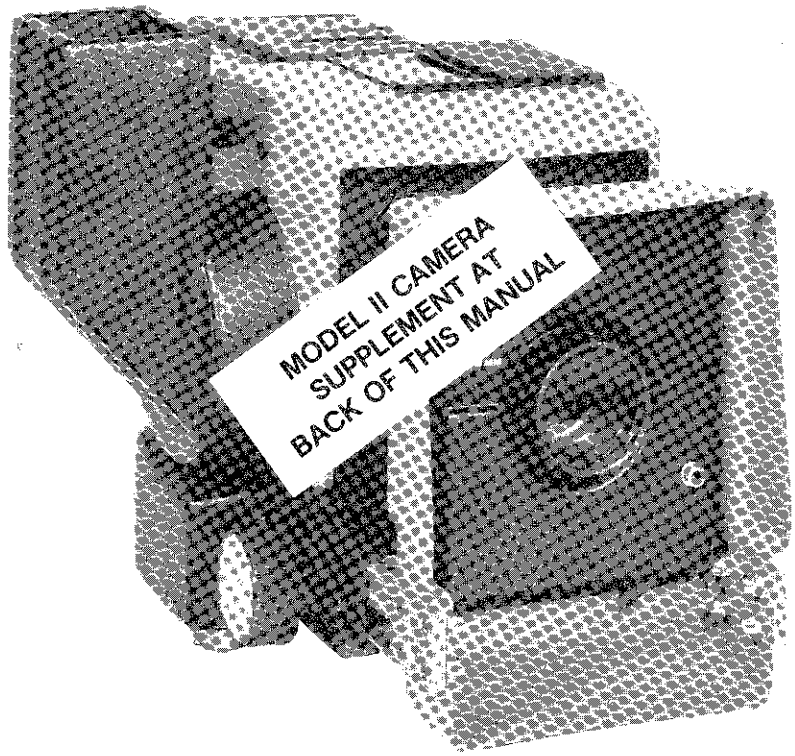
NORD® PHOTO ENGINEERING, INC.

AUTOMATIC SLR CAMERA



INSTRUCTION-SERVICE

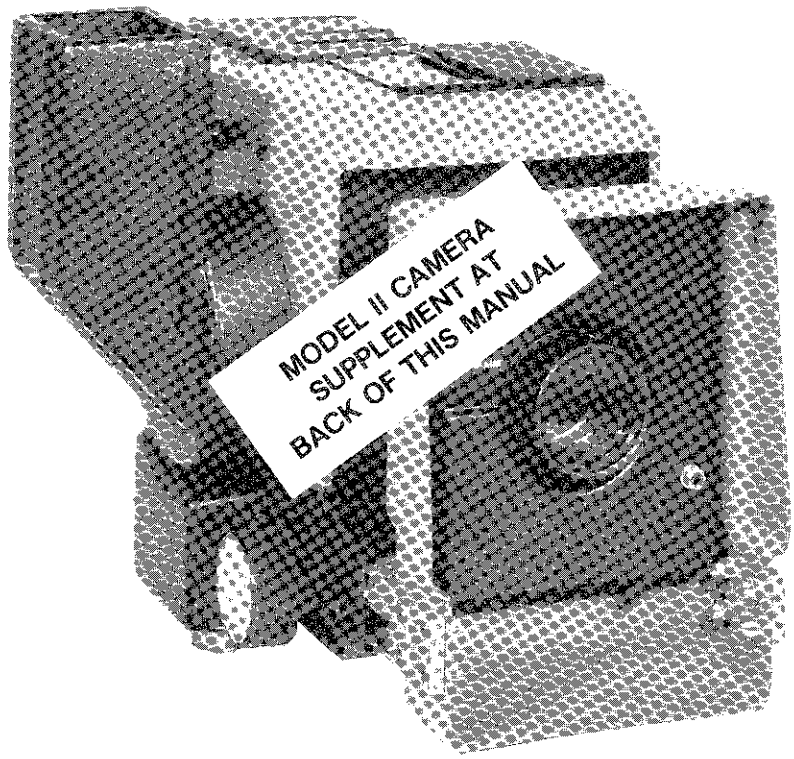
MANUAL

529 So. 7th Street, Minneapolis, Minnesota 55415 • Phone: (612) 338-0781 • Telex: 29-0226

NORD AUTOMATIC SLR CAMERA SPECIFICATIONS

CAMERA TYPE:	Electrically operated Single Lens Reflex
LENSES:	Nord screw-mount, matched front and rear elements Focal Lengths: 105mm, 127mm, 165mm, 190mm and 254mm
SHUTTER:	Electrically operated fixed speed, between-the-lens; electronic flash (x sync)
ELECTRICAL:	100 to 120 VAC, 60 Hz, approximately 1 amp

AUTOMATIC SLR CAMERA



NEGATIVE ID:	Records data from 1/2 x 2-1/2 area of ID card between negative frame.
FILM MAGAZINE:	Automatic, motor driven; separate cassette and motor drive units for film sizes of 70mm, Ideal, split 70mm, 46mm, 35mm unperf and 35mm perf. Maximum load, 100 ft; film wound emulsion in daylight load or cored.
REVOLVING BASE:	Allows camera rotation of 90° or less
SHIPPING WT.:	Camera: 15 lbs. (6.8 kg) Cassette: 5 lbs. (2.3 kg) Shutter & Lens: 3 lbs. (1.4 kg) Drive: 4 lbs. (1.8 kg) Case: 15 lbs. (6.8 kg) Revolving Base: 4 lbs. (1.8 kg)

ASSEMBLY

I. Unpacking Instructions

II. Equipment, Tools, Facilities Required for Camera Use

III. Assembly Instructions

IV. Adapting Other Manufacturers Equipment

I. Unpacking Instructions

A. Upon receipt of shipment, examine all packages for signs of damage or mishandling. If any are found, notify the carrier immediately. Otherwise, open the carton(s) and remove the contents, saving all wrappings. Compare items received with the packing list and the original order. Inspect all items for visible damage. If a claim against the carrier is necessary, file it immediately.

B. If necessary use only oil-free compressed air to clean lenses, negative ID periscopes, or other optical components. Air may also be used for cleaning the interior of a film cassette.

II. Equipment, Tools, Facilities Required for Camera Use

A. Equipment Required

1. A tripod capable of safely supporting at least 20 pounds, such as one suitable for a large format view camera.

B. Tools Required

1. 5/64" Allen wrench
2. Flat blade screwdriver set
3. Phillips screwdriver set
4. Soldering iron or gun
5. Solder
6. Dykes or wire stripper
7. Spring scale, ounces

C. Facilities Required

1. 117 VAC, 60 Hz, 3 prong grounded outlet
2. Darkroom or changing bag for loading cored film

III. Assembly Instruction

A basic working camera consists of a camera body, lens and shutter, viewfinder mask, magazine, and power and shutter tripper cords. ID equipped cameras also require a periscope.

A. Mounting shutter on the camera:

1. Fully extend the camera bellows.
2. Aligning the shutter electrical connector with the mating socket on the camera front standard, press the shutter in place and fasten with four large knurled-head screws inserted from the bellows side of the standard.
3. NOTE: All cameras are provided with a screw inserted in a threaded hole in the camera's right focus rail; when 127mm lenses are mounted, remove this screw to allow full focusing range. Retain the screw in the rail for all other lenses to prevent contact between the lens rear element and the viewing mirror.

B. Attaching motor drive to cassette - complete magazine:
   1. Place the cassette with the cover side face down.
   2. Matching motor drive gears with the projecting cassette gears, place the drive on the cassette and make sure it lies flat. If it does not, turn the cassette gears to mesh with the motor gears. When this is done properly, a small amount of springiness will be felt between the two due to spring-loaded contacts on the motor pushing down on the mating cassette contacts.
   3. Insert and tighten the three long fastening screws.

C. Viewfinder mask installation:
   1. A viewfinder mask matching the film format must be installed at the ground glass surface, except in the case of 70mm film, when none is needed. The size of the mask aperture must match the film format/image size. The following table lists the aperture sizes for ease in identifying masks.
   2. Select the correct mask for the film size used.

Viewfinder mask aperture sizes

Full 70mm.....	No mask required
Ideal format..	2-1/4" x 2-3/4"
Split 70mm....	1-3/4" x 2-3/4"
46mm.....	1-3/4" x 2-3/4"
35mm unperf...	1-1/4" x 1-3/4"
35mm perf.....	15/16" x 1-7/16"

   3. To install a mask:
      a. Remove six Phillips screws from the camera back and remove it from the body.
      b. Insert one edge of the mask beneath the black metal clip on the ground glass frame and snap the other edge beneath the plastic clip. The mask rests against the shiny side of the ground glass.
      c. If the ground glass is to be marked with head size and position guides, this is the most convenient point at which to do it. Use only a china marking pencil, writing only on the shiny side of the ground glass (the mask side).
   4. When reinstalling the camera back, be careful of clearances between the bottom of the mirror assembly and the green printed circuit boards. Also, be sure that no plugs or wiring protrude into the optical path.

D. Installing negative identification (neg ID) periscopes:
   1. Select the correct periscope for the film size used. (Size is marked on the periscope body.)
   2. Insert the periscope in the opening beneath the bronze locking strip on the back and push it upward until the strip locks with an audible click. For removal, gently lift the strip while pulling downward on the periscope.

E. Mounting Nord Magazines on the camera:

1. To attach the magazine to the camera, pull up on the sliding lever at the left rear of the camera. Remove the dust cover, if one is present.
2. Holding the magazine with the motor drive unit on the right, slide the right edge of the magazine's face plate beneath the lip on the camera back, then push the face plate flat against the back and slide the locking lever fully down. Test for secure mounting.
3. Connect the motor drive plug to the socket at the rear of the power box; it must firmly lock in place. To remove it, press the locking tab and pull the plug.

F. Mounting the camera on a revolving base:

1. Position base with longer leg of the cradle to the left.
2. Placing a loaded camera on the cradle, select that pair of camera mounting holes which allow best weight distribution and align them with the mating base screws.
3. Pushing the spring-loaded screws in, tighten them fully.
4. Rotate camera to desired angle and lock cradle in place.

G. Mounting the revolving base on a tripod:

1. See part II A. 1.
2. There are three different tripod mounting holes in the bottom of the revolving base to allow the best balancing of a loaded camera. Place the base with camera and magazine on a rigid tripod, find the best position, and tighten the tripod screw.

H. Mounting the camera on a tripod:

Vertically

Position a loaded camera over the tripod so that one of the bottom mounting holes gives best balance, and tighten the tripod screw firmly to lock the camera in place.

Horizontally

Positioning a loaded camera over the tripod, find which of the two mounting holes on the left camera side gives best balance, then tighten the tripod screw firmly to lock the camera in place.

J. Electrical connections:

1. Shutter tripper cord:
   a. The connector for the cord plugs into the socket under the power box closest to the front of the camera. Use the threaded locking ring to secure the plug in place.
2. Sync cord modification:
   a. An adapter plug supplied with each shutter must be used to replace the existing plug on the sync cord.
      1. Cut the original plug off the camera end of the cord.
      2. Strip 3/8" of insulation from the cut wire ends.
      3. Unscrew the barrel of the adapting plug and pass both wire ends through it from the end with the small hole.

4. Insert one wire end in the center terminal of the plug and solder it in place, using rosin-core (radio-TV type) solder.
5. Solder the other wire to the metal strip coming from the outer casing.
6. Wrap electrical tape around the center soldered connection to insulate it from the outer casing, then screw the plug barrel back on.

3. Power cord:
   a. Plug the power cord into the mating connector on the underside of the power box.
   b. The other end of the cord plugs directly into a 3-prong grounded A.C. outlet. The camera is now energized.

IV. Adapting Other Manufacturers Equipment

A. Camerz magazines: An electrical adapter is available for Camerz (Photo Control) Series D magazines only.
   1. Physically mount the magazine on the camera in a manner similar to mounting Nord magazines.
   2. Mount the electrical adapter on the left side of the camera using a tripod mounting hole, or in any other suitable place.
   3. Connect the plug from the top of the magazine to the matching socket on the side of the adapter.
   4. Plug the connector with gray cord from the adapter into the matching connector on the rear of the magazine.
   5. Connect the plug with the black cord from the adapter to the socket on the rear of the power box.

B. Beatty-Coleman magazines: An electrical adapter is available for Beatty-Coleman Series D108, D56, F80, or C54 magazines only.
   1. Physically mount the magazine on the camera.
   2. Mount the electrical adapter on the left side of the camera using a tripod hole.
   3. Plug the connector from the magazine into the socket on the side of the adapter.
   4. Connect the plug with the black cord from the adapter to its mating socket on the rear of the power box.

C. Mounting roll film backs on the camera:
   1. Graflex RH and Mamiya roll film holders for 2-1/4 roll film (ideal format only) require an adapter plate to fit the Nord SLR. (See parts figure 10.)
   2. To attach the adapter to the holder, orient the adapter plate with the longest dimension horizontal and with the rivets up and on the right side.
   3. Holding the film back with the cover assembly on the left and the frame assembly to the right, slip the frame into the adapter. Secure it to the adapter with the two metal strips and six screws provided. (See parts figure 10.)
   4. To attach the adapted film back to the camera, follow the mounting instructions for a magazine.
   5. The camera will operate automatically in all respects except for film advance, which must be done manually.

OPERATION

I. Considerations for Camera Use

II. Taking Pictures

III. Storage of Camera and Accessories

I. Considerations for Camera use

A. Lens selection

A general rule-of-thumb for selecting a lens of proper focal length is to use approximately twice the diagonal measurement of the film. However, working distance, head size and space available on location, may necessitate the need for a different focal length lens. See Table 1 for comparisons of film sizes, lens focal lengths, working distances, and subject picture areas.

TABLE 1

Working Distance - Camera to Subject

Lens Focal Length	Format	School Photos (14x20 area)	Head & Shldrs. Portraiture (20x28 area)	Full Length (4½'x6½')	Full Lgth. Groups (12'x8')
254mm		68 in.	88 in.	18 ft.	34 ft.
190mm	Full 70mm	50 in.	66 in.	14 ft.	25 ft.
165mm	(2-1/2 x 3-5/16)	44 in.	57 in.	12 ft.	22 ft.
127mm		34 in.	45 in.	9 ft.	17 ft.
105mm		27 in.	36 in.	7 ft.	13 ft.
254mm		72 in.	98 in.	21 ft.	36 ft.
190mm	Ideal Format	54 in.	76 in.	17 ft.	27 ft.
165mm	(2-1/4 x 2-3/4)	48 in.	67 in.	15 ft.	24 ft.
127mm		38 in.	55 in.	12 ft.	19 ft.
105mm		32 in.	46 in.	10 ft.	15 ft.
254mm		90 in.	10 ft.	26 ft.	50 ft.
190mm	Split 70mm	70 in.	94 in.	19 ft.	36 ft.
165mm	(1-3/4 x 2-1/2)	60 in.	80 in.	17 ft.	30 ft.
127mm		45 in.	62 in.	13 ft.	24 ft.
105mm		38 in.	50 in.	10 ft.	19 ft.
254mm		90 in.	10 ft.	26 ft.	50 ft.
190mm	46mm	70 in.	94 in.	19 ft.	36 ft.
165mm	(1-3/4 x 2-1/4)	60 in.	80 in.	17 ft.	30 ft.
127mm		45 in.	62 in.	13 ft.	34 ft.
105mm		38 in.	50 in.	10 ft.	19 ft.
254mm		10 ft.	13 ft.	36 ft.	70 ft.
190mm	35mm unperf.	85 in.	10 ft.	27 ft.	50 ft.
165mm	(1-1/4 x 1-3/4)	75 in.	8 ft.	23 ft.	45 ft.
127mm		56 in.	75 in.	18 ft.	35 ft.
105mm		45 in.	62 in.	14 ft.	28 ft.
254mm		14 ft.	18 ft.	65 ft.	84 ft.
190mm	35mm perf.	10 ft.	14 ft.	33 ft.	62 ft.
165mm	(15/16 x 1-7/16)	8 ft.	12 ft.	28 ft.	52 ft.
127mm		80 in.	9 ft.	22 ft.	42 ft.
105mm		66 in.	80 in.	20 ft.	38 ft.

B. Viewfinder Mask

The film size and advance of the magazine being used will determine the Viewfinder Mask to be used. Refer to Table 2 for proper mask size, and Table 3 for film size and advance lengths.

TABLE 2

Viewfinder Mask Aperture Sizes

Full 70mm ---- No mask required
Ideal Format - 2-1/4" x 2-3/4"
Split 70mm --- 1-3/4" x 2-3/4"
46mm --------- 1-3/4" x 2-3/4"
35mm unperf.-- 1-1/4" x 1-3/4"
35mm perf.---- 15/16" x 1-7/16"

TABLE 3

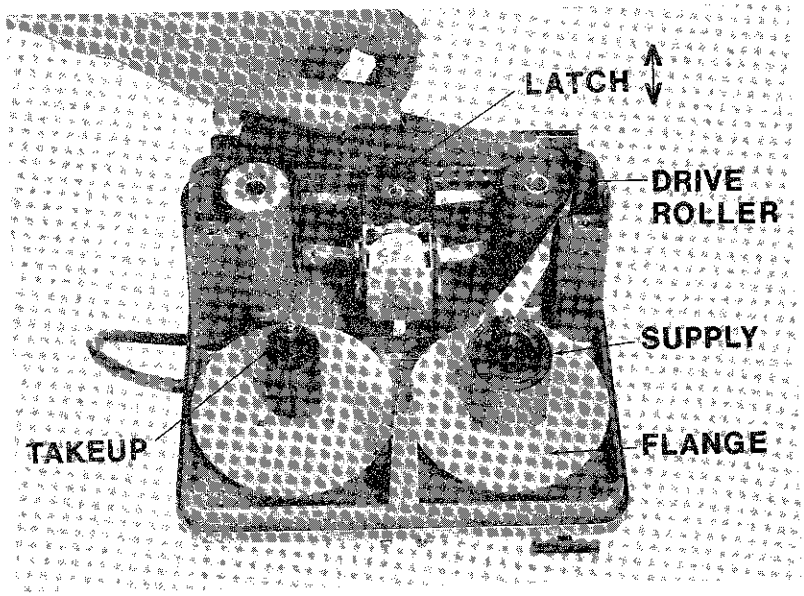
Cassette & Motor Drive

The following table identifies cassette sizes and lists mating motor drive units and their film advance lengths.

Cassette Part No.	Cassette Size	mates with	Motor Drive Part No.	Film Advance Length
040536	70mm		040739	3-5/8"
040740	Ideal Format		040741	3"
040742	Split 70mm		040743	1-3/4"
040744	Split 70mm with ID		040745	2"
040607	46mm		040746	2-1/4"
040747	46mm with ID		040748	2-1/2"
040605	35mm unperf.		040743	1-3/4"
040750	35mm unperf. with ID		040745	2"
040761	35mm perf.		040762	1-1/2"
040854	35mm perf. with ID		040743	1-3/4"

C. Magazine

1. Magazine loading and assembly instructions:
   a. A complete magazine consists of a film cassette and a motor drive fastened together.
   b. Loading a cassette with film:
      1. Follow film manufacturer's general recommendations for film handling.
      2. Remove the cassette cover by unfasteneing the three knurled head screws. Inspect the cassette interior for cleanliness and if necessary use compressed air to blow out dust. Also remove any emulsion buildups.
      3. Pull the pressure plate latch up. (see illustration below)
      4. If daylight load film is used, the red flanges must be removed from the cassette and cover. The flange screws must be replaced in the cassette to prevent light leaks. Save, but do not replace the flange screws in the cover. With cored film, the flanges must be left in place.
      5. Place the film core or spool on the right (supply) spindle, film winding clockwise off the spindle. NOTE: only film wound emulsion <u>in</u> can be used.
      6. Guide the film around the rubber drive roller, slanting it upward to the left. Pull it across the pressure plate and around the idler roller. Lower the film into the film plane; a sawing motion will help the film slide into place.
      7. Verify that the film is flat and centered behind the aperture plate, then push the pressure plate latch down.
      8. Making sure any slack in the film is taken up, wind the free end clockwise around the take-up and secure it. Do not use tape for this purpose.
      9. Replace the cassette cover. Unless all edges are snugly fitted into the light-blocking channel, the cover fasteners cannot be fully tightened down. Before turning on room lights, verify that the cover is secure.



2. Unloading film:
   a. Used cassettes must only be opened in the dark.
   b. After film is removed, clean the cassette as necessary.

3. Operating the magazine:
   a. When using daylight load film, the several feet of leader must be advanced before shooting, since the outer layers of film will be fogged. Advance 12 exposures with 70mm film, 25 frames with 46mm and 30 frames with 35mm film.
   b. To advance film, press the yellow button on the motor drive. During film advance, the button lights up.
   c. When a cassette runs out of film, the drive unit will run continuously; it may be stopped by unplugging the magazine.
   d. Reset the frame counter to zero.

4. Below, Table 4 lists the approximate number of pictures possible with each format on 100' of cored film. When daylight load spools are used, if several feet of leader is not advanced, extra pictures might be obtained; however, in this case one runs the risk of taking the first few pictures on fogged film.

TABLE 4

Approximate Number of Frames per 100' Roll of Film

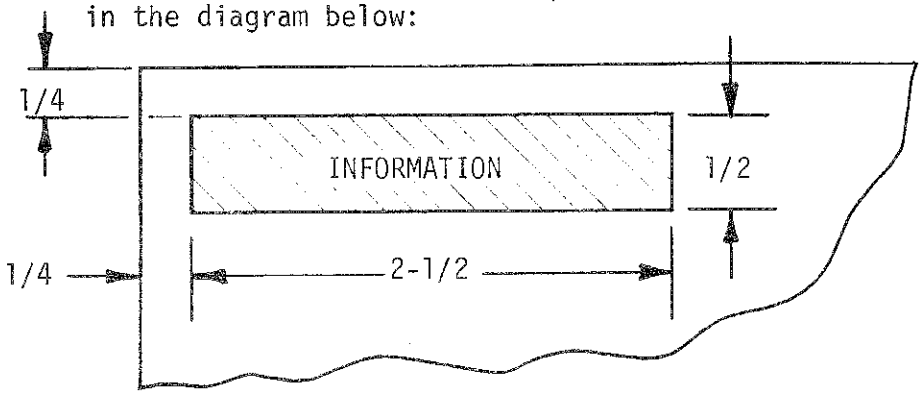
325	Full 70mm
385	Ideal Format (2-1/4 x 2-3/4)
590	Split 70mm w/Neg. I.D.
650	Split 70mm
465	46mm w/Neg. I.D.
510	46mm
590	35mm unperf. w/Neg. I.D.
650	35mm unperf.
650	35mm perf. w/Neg. I.D.
775	35mm perf.

D. Negative Identification System

1. The negative identification system (ID system) takes information written within a 1/2" x 2-1/2" space on a card inserted in the ID target area and projects it through a periscope onto the space between image frames. Each film size requires a matching periscope.

2. Use ID equipped cameras with ID equipped magazines and a periscope; use non-ID cameras with non-ID magazines and no periscope. In an emergency a non-ID magazine may be used with an ID camera but no periscope is to be used or part of the image will be blocked; no data can be recorded with this combination. An ID magazine, with its slightly longer film advance, could be used with a non-ID camera, but this combination wastes the space that would normally be filled with ID data.

3. I.D. Card format:
   a. Identification data is most conveniently written on a 3x5 index card; the area reproduced on film is shown in the diagram below:



4. Using ID System:
   a. Install proper size periscope to match the film format being used. See Assembly section.
   b. Before shooting, insert ID data card face down in the ID slot on top of the camera.
   c. Take the picture. A green indicator on the camera back will light, indicating exposure of the data.

E. Vignetter

Refer to the Harrison publication for proper use.

II. Taking Pictures

A. Exposure

1. Set the "f" stop according to recommendations of the film and/or flash manufacturers. Push the knob in and turn it to the desired "f" stop setting, making sure the locating pin drops into the hole.
2. Align the viewfinder vertically or horizontally for ease in compqsing.
3. Turn the focusing knob until a sharp image appears in the viewfinder. Depth of field may be checked by pressing on the black preview lever beneath the shutter.
4. Depressing the tripper cord switch will cause one exposure, film advance and reseting of the camera. NOTE: Do Not depress while advance indicator light is on.

B. Double Exposure

1. In the event that a double exposure would be desired, simply unplug the magazine power cord from the camera.

C. End of Film

1. When the camera runs out of film, the motor drive will run continuously. It may be stopped by unplugging the magazine.

III. Storage of the Camera & Accessories

Avoid storage of any camera or accessories in extreme temperature or humidity conditions.

MAINTENANCE

I. Maintenance

II. Part Replacement and Adjustments

I. Maintenance

A. After each shooting session:

1. After unloading film from cassette, clean the unit with compressed air.

B. Biannually

1. Remove the camera back and use oil-free compressed air to blow dust from the camera interior. Do this with the shutter removed, and tap the bellows to shake dust from the inside folds. Blow dust off all optical surfaces; do not use cleaners or tissues on front surface mirrors.
2. Tighten any loose screws.
3. Clean cassette interiors; use alcohol (rubbing type) to clean the rubber rollers. Remove the pressure plate solenoid assembly and clean it. Do not use materials that could scratch the surface.
4. All accessible lens surfaces should be cleaned either using oil-free compressed air or non-abrasive tissue with small amounts of lens cleaning fluid. Do not use silicone-treated tissues or silicone based fluids or the lens coatings may be damaged.
5. Do not lubricate any part of the camera.

II. Part Replacement and Adjustments

A. Camera Body

1. Focus knob tension adjustment.
   a. Beneath the focus knob support is a set screw, to maintain tension for focusing. Turn the screw clockwise to increase, or counterclockwise to decrease, focusing effort.
2. Front standard alignment
   a. The purpose of this operation is to orient the front standard parallel to the front of the camera.
   b. Remove the shutter, then remove the four screws and nuts which fasten the bellows to the standard. Loosen the front standard screws.
   c. Place a 7x7 inch glass or flat metal plate between the front standard and camera body.
   d. Crank the focus down until both sides of the front standard are completely flat on the plate. Tighten the screws and check the alignment. If the front standard is warped, replace.

3. Power box replacement (CAUTION: DISCONNECT POWER CORD FROM OUTLET)
    a. Remove four screws at perimeter of box cover.
    b. Pull the cover off gently; remove four screws from inside plastic piece.
    c. Pull gently on the inside plastic section until the connector unplugs from camera.
    d. Install new power box by reversing the procedure.
4. Viewfinder
    a. Unscrew the three screws at the perimeter of the viewfinder periscope base. Pull the housing off.
    b. The four screws seen around the lens are fastened inside the camera body with nuts. The camera back must be removed for access to these.

B. Shutter

1. Changing the Shutter/Lens
    a. Rack the bellows all the way out and remove the four thumbscrews behind the shutter. Pull the shutter straight out to unplug it.
    b. Unscrew the front (F) and back (B) lens.
    c. Remove the f-stop knob by loosening the two allen head set screws. Remove the two screws on the f-stop plate and transfer the plate to the new shutter.
    d. Replace the screws and the knob (adjust to the correct f-stop).
    e. Screw the front (F) lens element into the front of the shutter and the back (B) element into the back of the shutter until snug.
    f. Plug the shutter into the camera and fasten with the thumbscrews.
    g. If a 127mm lens is being used, remove the right rail stop screw.
2. Blade replacement
    a. Remove both lens elements.
    b. Remove four screws and the rear cover plate.
    c. Remove the five blades by lifting them out.
    d. Install the new blades one at a time, starting at the electrical connector end of the shutter. Each blade overlaps the provious blade. When all blades are in. test for correct placement and free movement by using the preview lever.
    e. Reinstall the rear cover plate.
3. Rotary solenoid replacement
    a. Remove the rear shutter plate and the shutter blades.
    b. Remove the screw from the white plastic cable clamp around the solenoid wires, near the solenoid.
    c. Remove three screws from the solenoid arm and lift it off the solenoid, being careful not to pull the wires off.
    d. Remove the two nuts holding the solenoid screws and the solenoid to the base plate.

e. Cut the solenoid leads about 2" from the body. Strip 3/8" of insulation from the ends of the white shutter leads remaining.
f. Cut the new solenoid's leads to a length of 2-1/4" from the body, then strip 3/8" of insulation from each wire.
g. Twist together one wire end from the solenoid, and one wire end from the shutter; solder the connection and insulate with electrical tape. Repeat for the remaining two leads.
h. Mount the new solenoid with the holes through which the leads emerge pointing toward the longer edge of the baseplate (see parts photograph fig. 6 for orientation - this is important).
i. Reclamp the leads to the base plate (step b).
j. Reattach the solenoid arm (three screws).
k. Refer to the shutter parts photograph to verify that all parts are correctly mounted.
l. Reinstall the shutter blades and verify with the preview lever that they move freely.
m. Reinstall the rear cover plate.

4. Linear solenoid replacement
   a. Remove four screws from the solenoid mounting bracket and lift it off.
   b. Remove the two black screws from the preview lever mounting block. Slide the mounting block and solenoid plunger free from the solenoid.
   c. Cut the solenoid leads about 1" from the body.
   d. Insert the flat end of the new plunger/yoke into the preview lever mounting block; engage the shutter blade drive post in the yoke and reattach the preview lever mounting block to the base plate, making sure the wiring passes through the tunnel in the block, and is not pinched beneath it.
   e. Cut the leads of the new solenoid about 1-1/2" from the body, and strip 3/8" of insulation from each wire. Also strip 3/8" of insulation from the old shutter-to-solenoid leads.
   f. Twist one solenoid wire end together with one shutter lead wire end, and solder the connection. Insulate with electrical tape. Repeat for the other pair of wires.
   g. Slide the new solenoid onto the pointed end of the plunger.
   h. Place the solenoid mounting bracket over the solenoid and position the end of the solenoid so that there will be clearance for the shutter cover to fit - leave about 1/16" of space. Tighten down the bracket to lock the solenoid in place.
   i. Use the preview lever to test for proper free movement of the plunger and shutter blades.
   j. Replace the shutter cover.

C. Mirror and Backplate Assembly

1. Changing Negative I.D. System Periscopes:
   a. Remove the magazine.
   b. Lightly grasp the sides of the periscope assembly in the negative opening and lift the end of the copper spring. Pull the periscope out.

      CAUTION: Do Not touch the first surface mirror in the periscope.

   c. Insert the replacement periscope with the mirror facing the negative opening. Lift the spring and slide the periscope in until the lock pin drops into the periscope.
2. Changing I.D. lamp assembly:
   a. Remove six Phillips screws to remove the camera back.
   b. The I.D. lamps are mounted in a plastic shell which slides snugly between metal clips. To remove it, pull gently on its power cord.
   c. Disconnect the power plug and substitute the new lamp assembly, sliding it all the way back between the clips.
3. Roller microswitch replacement:
   a. Unsolder the gray wire from the common terminal of the switch, and also the yellow wire from the terminal marked "NO".
   b. Remove two screws and lift the switch out. Replace with new switch and fasten firmly.
   c. Solder the wires onto the new switch following the connection given in step a above.
4. Roller microswitch adjustment:
   a. Loosen the two switch mounting plate screws; slide the switch and plate to a position such that the switch actuates ("clicks") during the first 3/16" of mirror travel. Tighten the mounting screws.
5. Long Arm microswitch replacement:
   a. Unsolder the blue wire from the terminal on the longest side of the switch, the white wire from the next terminal, and the red wire from the remaining terminal.
   b. Remove two screws from the switch and replace it; fasten the new switch tightly to the mounting plate.
   c. Solder the wires onto the new switch following the order of removal given in step a.
6. Long Arm microswitch adjustment:
   a. Loosen the two screws holding the switch mounting plate on the mirror box.
   b. Slide the plate and switch so that the switch is actuated by the last 3/16" of mirror travel. Retighten the two plate mounting screws.

7. Rotary solenoid replacement:
    a. Cut the two solenoid leads about 3" from the body of the unit.
    b. Pencil-mark the black mounting bracket on the side where the leads emerge from the solenoid case.
    c. Remove the bracket from the mirror box by removing two screws.
    d. Remove the solenoid from the bracket by loosening two nuts.
    e. For later reference, pencil-mark a line across the edges of the mirror drive clip disc (disc with wire loop) and the camspacer. Remove the three screws holding these parts on the solenoid.
    f. Mount the new solenoid on the bracket with the leads pointing toward the mark made in step b.
    g. Set the solenoid and bracket down with the leads pointing toward the right. Place the flat side of the drive clip disc against the cam-spacer and line up the pencil-marks, then place the assembly on the solenoid with the wire loop pointing toward you. Fasten the disc and spacer with the three screws (step e).
    h. Mount the assembly back on the mirror box. Be sure the wire loop engages the mirror drive pin (the pin protruding through the curved slot). Test for correct cam-switch positioning as given in Maintenance section II. C. 4. a. (roller microswitch adjustment).
    i. Strip 3/8" of insulation from each of the old wire ends from the mirror box, and cut the new solenoid leads to a length of four inches, stripping 3/8" of insulation from these ends, too. Twist together one bare wire end from the mirror box and one solenoid wire end; solder the connection and insulate it with electrical tape. Do the same for the remaining two leads.
8. Mirror-drive clip and cam-spacer replacement:
    a. Follow steps c, e, g, and h in the instructions for rotary solenoid replacement.

D. Cassette

1. Pressure Plate Assembly
    a. Remove six screws holding the pressure plate assembly to the cassette.
    b. Pull the assembly out; be careful not to lose the two white insulating bushings.
    c. Reverse the procedure to install a new assembly, noting that the two round-head, longer screws fit in the center holes.
2. Supply Spindle Clutch
    a. Four screws holding the spindle cover plate are used to set clutch tension.
    b. Using a spring scale, attached to a string, wrapped around, but secured, to a film core; pull evenly on the scale and adjust tension to achieve a 7.1 - 8.8 ounce pull.

E. Motor Drive

1. The motor drive may be changed while a loaded magazine is mounted to a camera.
   a. Remove the three thumbscrews and disconnect the power cord by pressing the lock tab. Separate the motor drive assembly from the cassette
   b. Be sure the replacement motor drive has the proper metering cam for the film size being used. Position the drive against the cassette and fasten with the three thumbscrews.
   c. Connect the power cord to the camera.
2. Metering Cam
   a. Remove the motor drive cover.
   b. The metering cam is held down with four screws. Remove them.
   c. Fasten the new cam in place and verify that rotation opens and closes the microswitch. Refer to parts photograph for orientation.
   d. Replace the cover.
3. Microswitch Replacement and Adjustment
   a. Remove the motor drive cover.
   b. Remove the two screws, nuts, and lockwashers that hold the switch.
   c. Remove and transfer the clip-on leads one at a time from the old switch to the new switch.
   d. Mount the new switch, verify that rotation of the cam opens and closes the switch. Tighten the mounting screws.
4. Motor Replacement
   a. Disconnect the brake arm spring from the brake arm.
   b. Loosen the four large head screws holding the motor to the base plate. Carefully remove them noting that there is a washer and a spacer on each screw shaft between the base plate and the motor.
   c. Remove the brake arm (one screw).
   d. Remove the two large head screws with washers holding the brake solenoid assembly to the motor; remove the assembly.
   e. It is not recommended to try removing the motor leads from the printed circuit board. Instead, cut the leads off about 3" from the motor windings. Trim the new motor leads to a length of about 4" and strip 3/8" of insulation from their ends. Strip 3/8" of insulation from the motor end of the circuit board leads. Twist one motor wire end together with one circuit board wire end and solder the junction. Insulate with electrical tape. Repeat for the other two leads.
   f. Mount the brake arm on the new motor, then position and mount the brake solenoid assembly so that when the plunger pulls in, it will lift the spring-loaded brake pad from the motor's rotor.
   g. Mount the motor back on the base plate, with one washer and a spacer on each screw.
   h. Reattach the spring to the brake arm.

5. Contact Block
    a. To replace the electrical contact block, unsolder both wires.
    b. Remove the four mounting screws.
    c. Solder the wires to the new contacts.
    d. Remount the block.
6. Pushbutton Switch and Lamp Replacement
    a. The switch and lamp must be replaced as a unit.
    b. For easiest access, first remove the two screws holding the switch mounting bracket to the base plate.
    c. Remove the threaded ring and lockwasher holding the switch to the bracket.
    d. Cut the leads, one at a time, following this procedure:
        1. Cut a lead about an inch away from the body of the switch, and cut the corresponding lead on the new switch about 1-1/2" from the body. Strip 3/8" of insulation from both the new switch lead and the old lead coming from the circuit board.
        2. Twist the wire ends together and solder them. Insulate the connection with electrical tape.
        3. Repeat steps 1 and 2 for the remaining sets of wires.
    e. Remount the switch on the bracket, and the bracket to the base plate.

TROUBLE SHOOTING

I. Shutter

II. Viewfinder/Focus

III. Negative ID System

IV. Magazine

Trouble Shooting Guide

I. Shutter

Symptom	Cause
A. Shutter does not operate.	1. Tripper cord defective or not connected to power box. 2. Shutter not plugged in or seated properly. 3. Defective power box or power supply P.C. board. 4. Shutter blade drive ring binding. 5. Shutter blades are binding. 6. Defective shutter linear solenoid.
B. Electronic flash does not fire.	1. See "A" above - "Shutter does not operate." 2. Sync cord not plugged in or defective. 3. Shutter relay (K-4) defective. 4. Broken contact wires.
C. Flash fires out of sync.	1. Flash contact is out of adjustment. 2. Defective shutter relay (K-4)

II. Viewfinder/Focus

A. Viewfinder image cannot be focused.	1. Front and back lenses are reversec or not secure. 2. Shutter not seated properly on front standard. 3. Back plate not seated properly on camera body. 4. Viewfinder not properly mounted on it's base. 5. Front standard out of alignment with camera body.
B. Image on film not in focus.	1. Camera or subject movement. 2. Improper focus. 3. Lens not secure. 4. Shutter not secure to front standard. 5. Back plate not seated properly on camera body. 6. Magazine not mounted properly.

III. Negative ID System

A. No ID on film.	1. Lamps burned out or unplugged. 2. Periscope not in place. 3. ID mirror loose or broken. 4. Periscope mirror damaged.
B. ID in the wrong place on the film	1. Wrong periscope in use. 2. Wrong drive for film size. (Incorrect feed length.)
C. Blurred ID image.	1. Periscope not seated properly. 2. Defective periscope. 3. Loose mirror in ID assembly.

IV. Magazine

A. No film image	1. Mirror binding. 2. Mirror drive clip broken 3. Mirror long arm microswitch out of adjustment. 4. Shutter linear solenoid defective.
B. Film does not advance.	1. Drive power cord not plugged in or loose. 2. Film not loaded properly. 3. Pressure plate solenoid defective or bad connection between drive and cassette. 4. Red film plates are being used for daylight load film. 5. Supply spindle clutch to tight. 6. Brake/Solenoid defective or out of adjustment. 7. Cassette/Drive not mating properly.
C. Incorrect or inconsistant film advance.	1. Wrong drive assembly being used for film size. 2. Wrong or defective metering cam. 3. Brake spring loose.
D. Film advances continuously.	1. Advance microswitch improperly adjusted or defective. 2. Manual advance switch defective. 3. Defective K-5 relay.
E. Scratched film	1. Dirty cassette. 2. Pressure plate is scratched. 3. Pressure plate is not releasing during film advance.

IV. Magazine (continued)

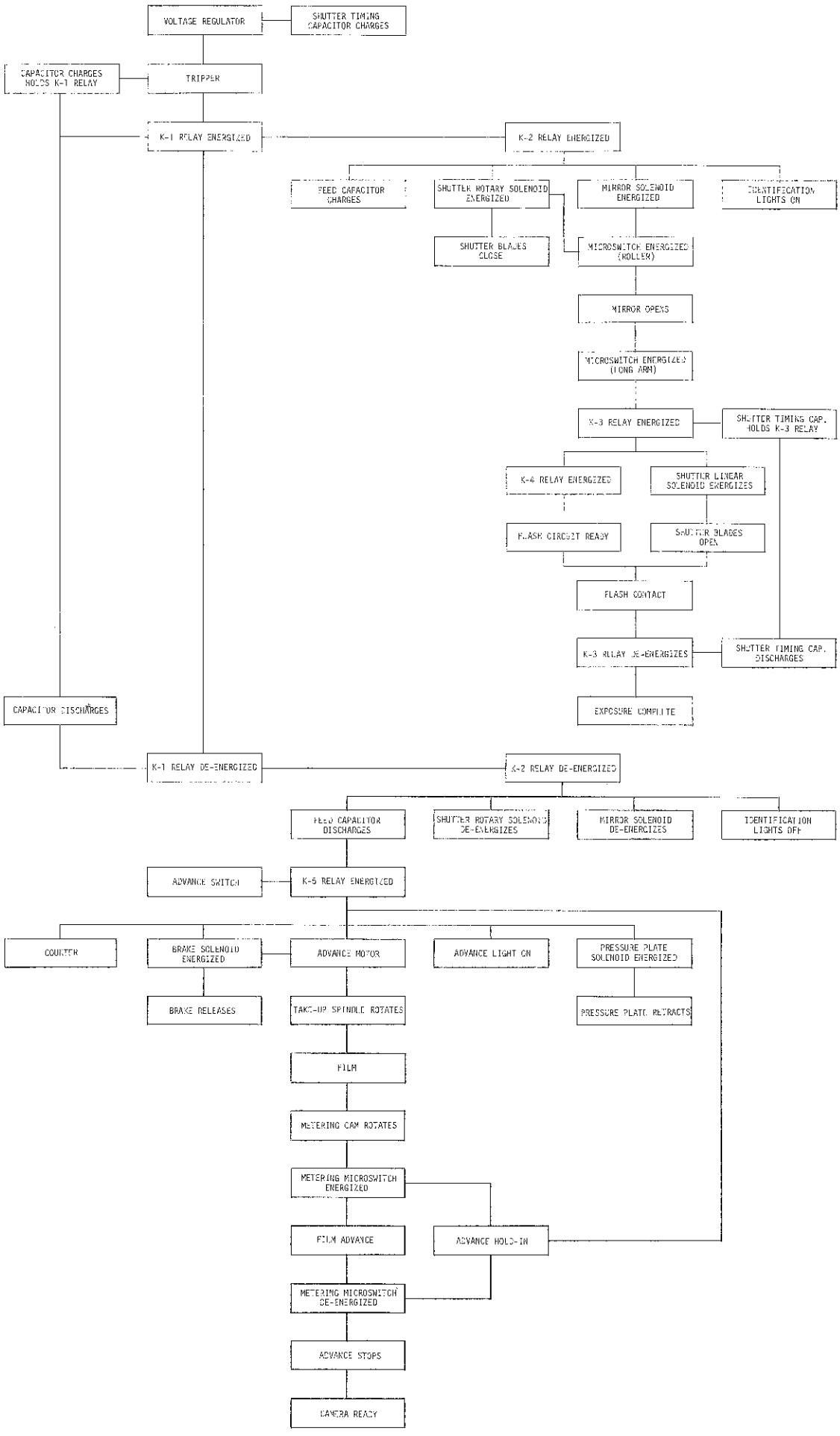
F. Fogged film.	1. Magazine not locked into place on camera body. 2. Cassette cover not fully seated. 3. Periscope missing or wrong periscope. 4. ID system light trap spring is defective. 5. Shutter malfunction.
G. Counter not operating.	1. Drive not operating. See "B", Film does not advance. 2. Defective counter.

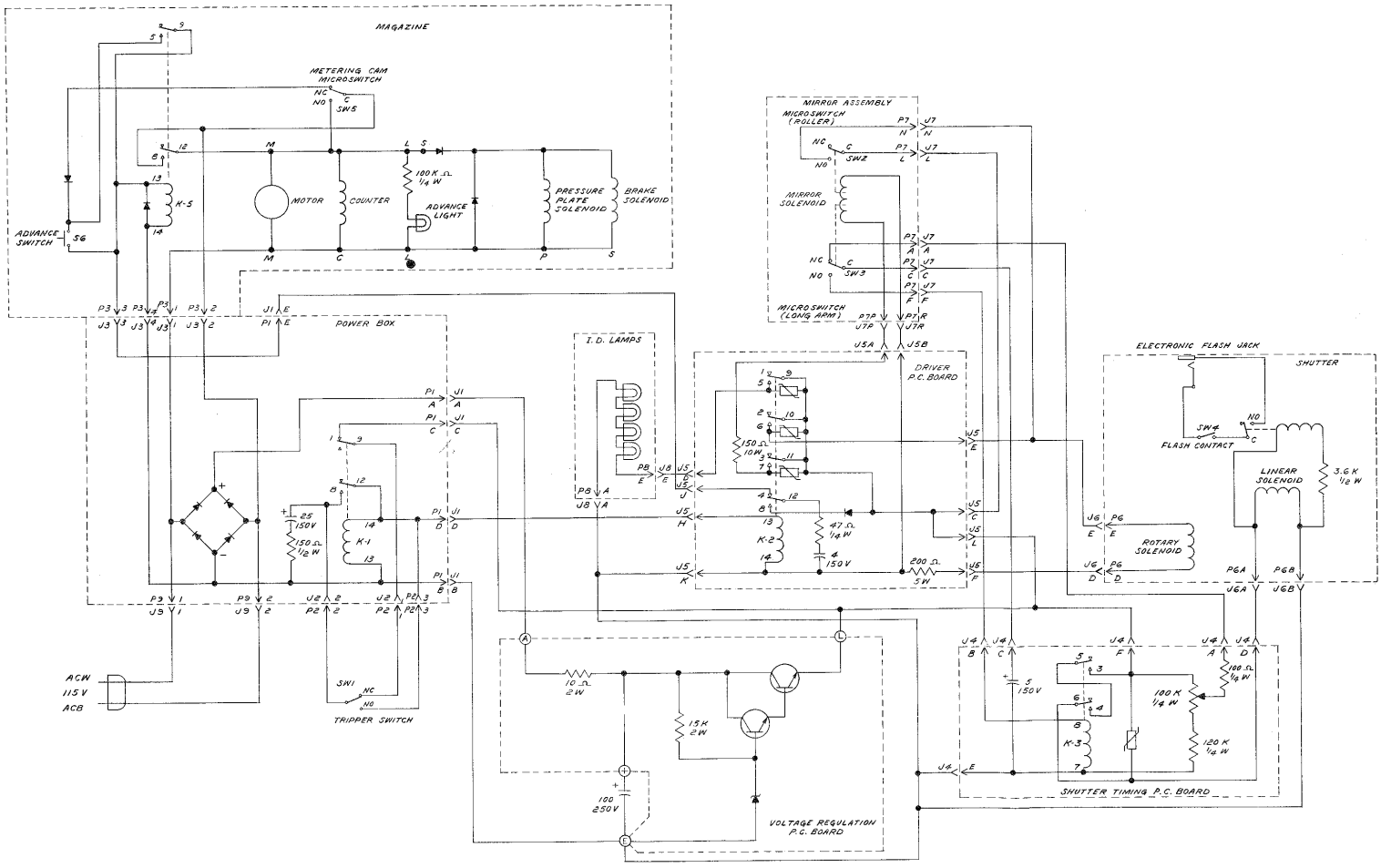
ELECTRICAL

Sequence of Operation

Schematic/Diagram

SEQUENCE OF OPERATION



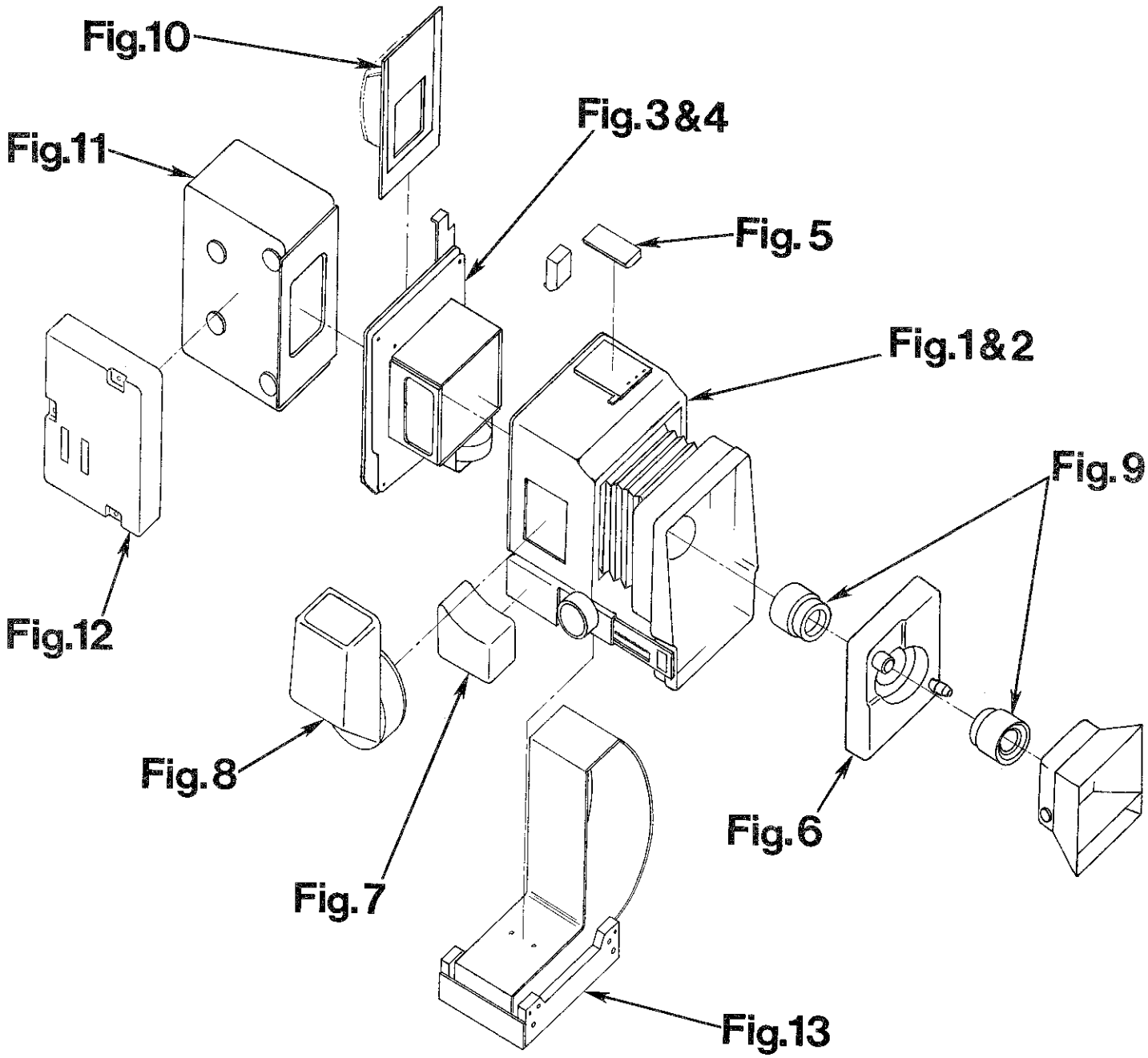


SCHEMATIC / DIAGRAM

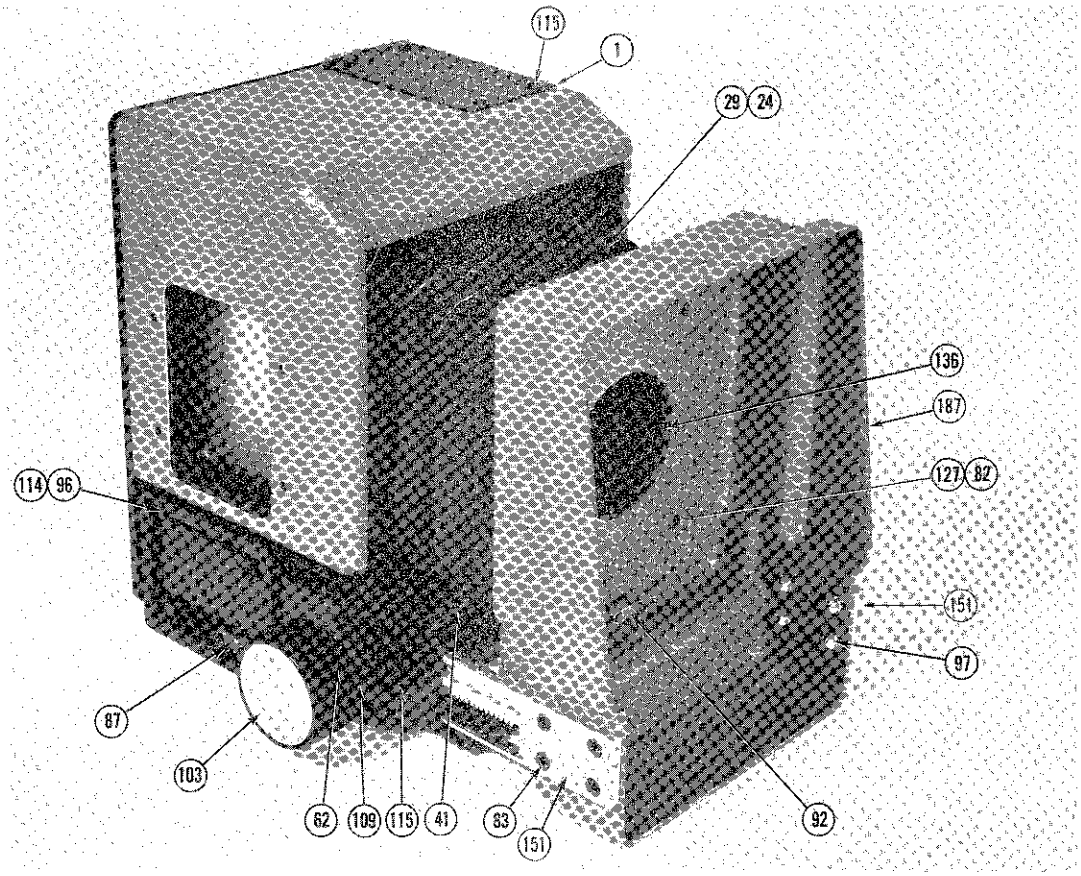
Find your part in the photos, take the KEY NUMBER and look it up in the parts list at the end of this section. Check the name and order the quantity needed by the NORD part number. Do not order parts by key numbers

PARTS

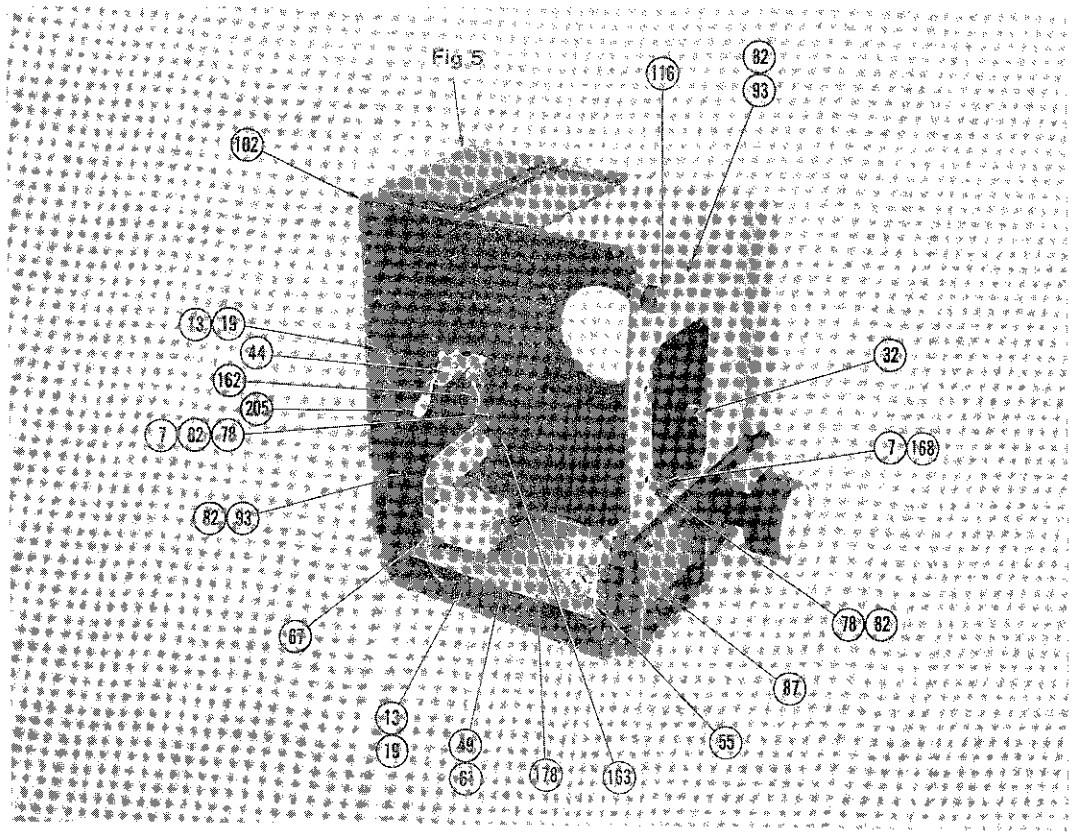
Page No.	Parts Figure
1	Parts Figure Reference
2	Front Body
2	Rear Body
3	Back Plate
3	Back Plate & Mirror
4	Negative Identification System
4	Shutter
5	Power Box
5	Viewfinder
6	Lenses
6	120 Roll Film Adapter
7	Cassette
8	Drive
8	Revolving Base



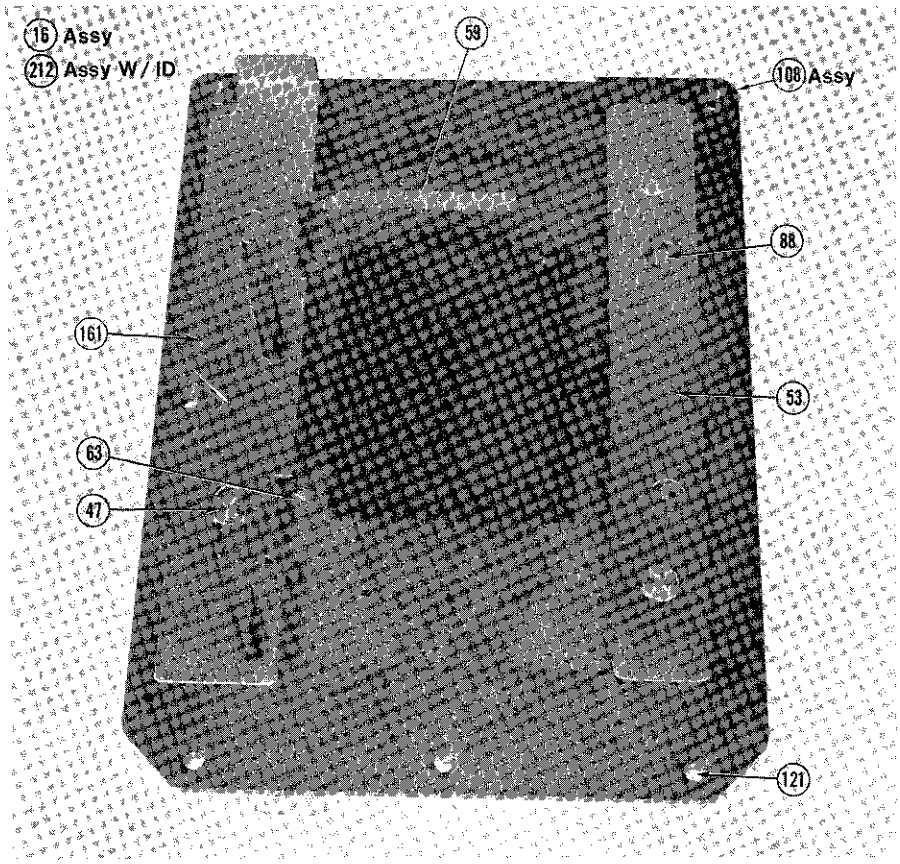
PARTS FIGURE REFERENCE



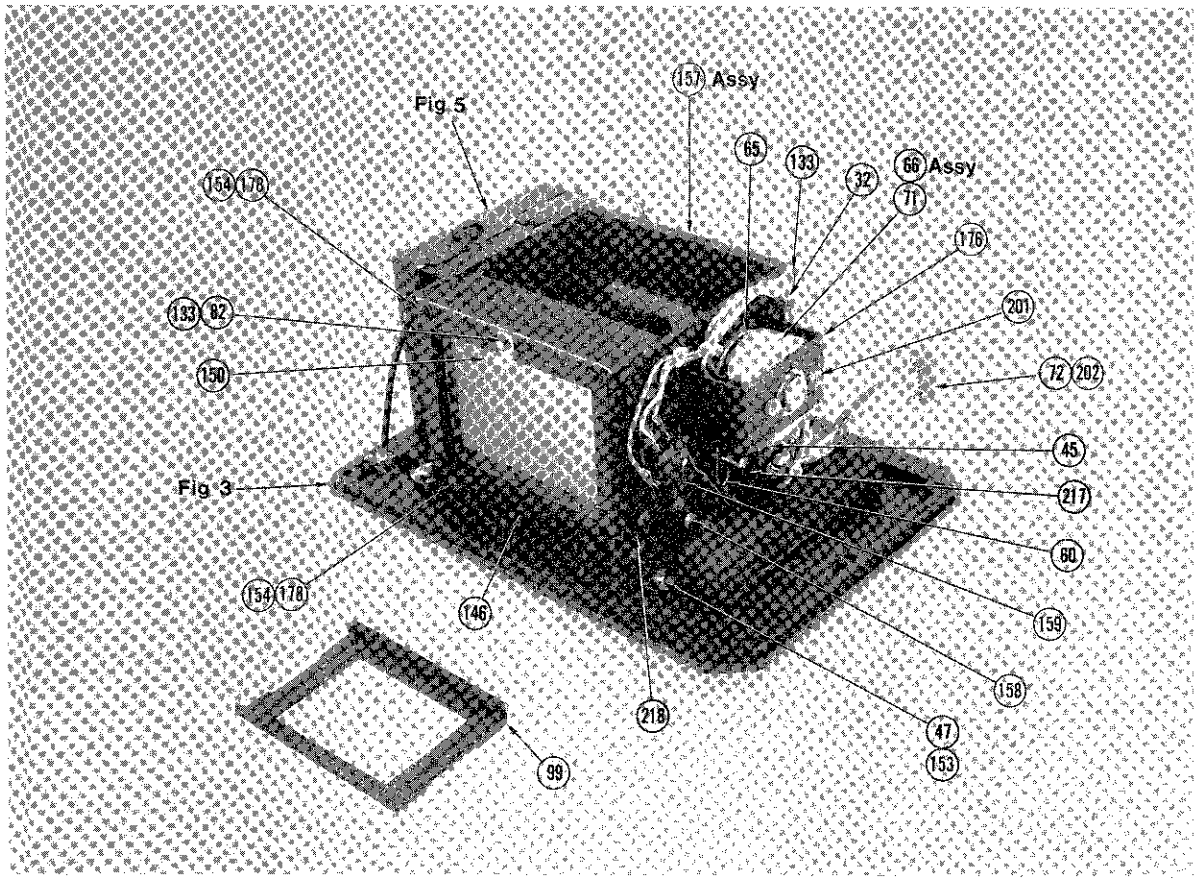
Parts Figure 1. Front Body



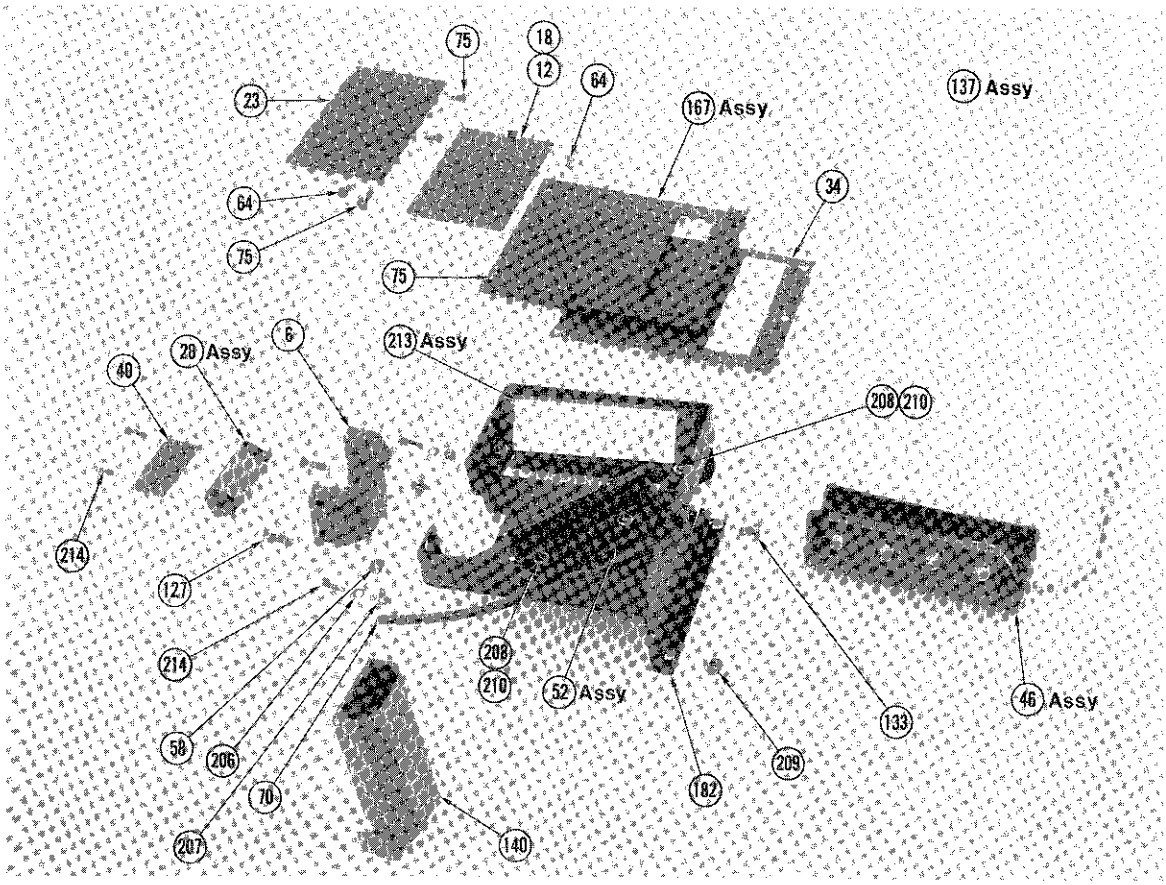
Parts Figure 2. Rear Body



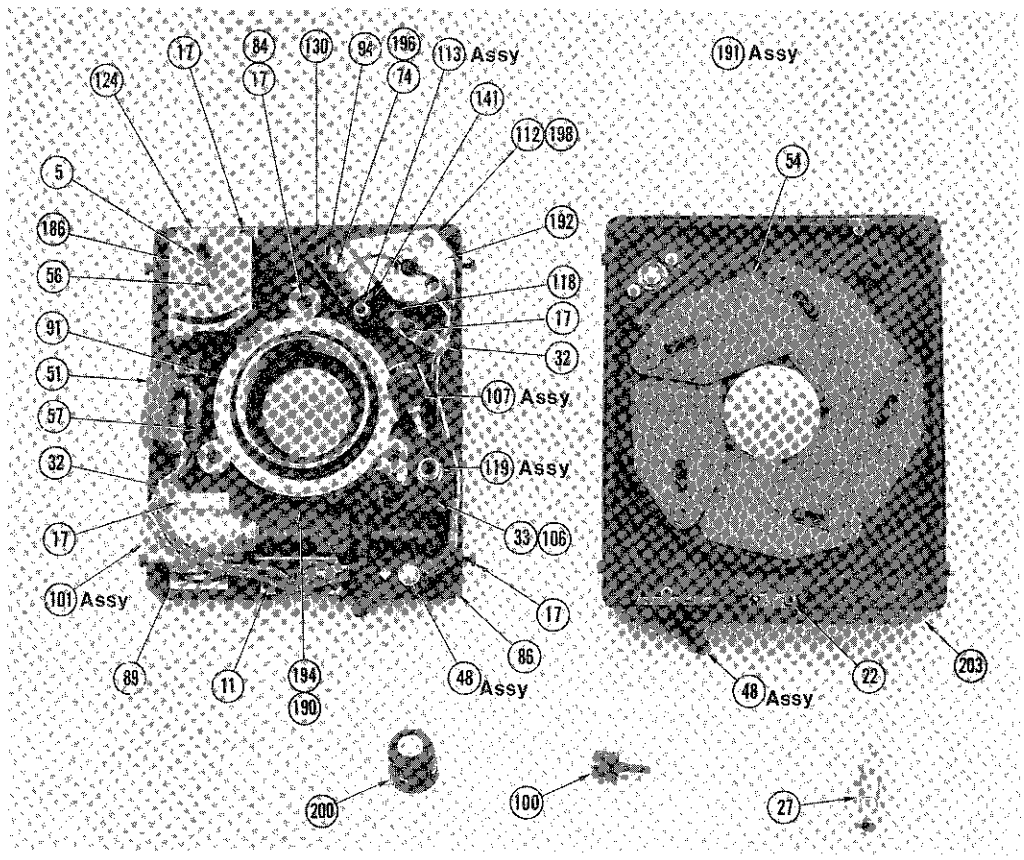
Parts Figure 3. Back Plate



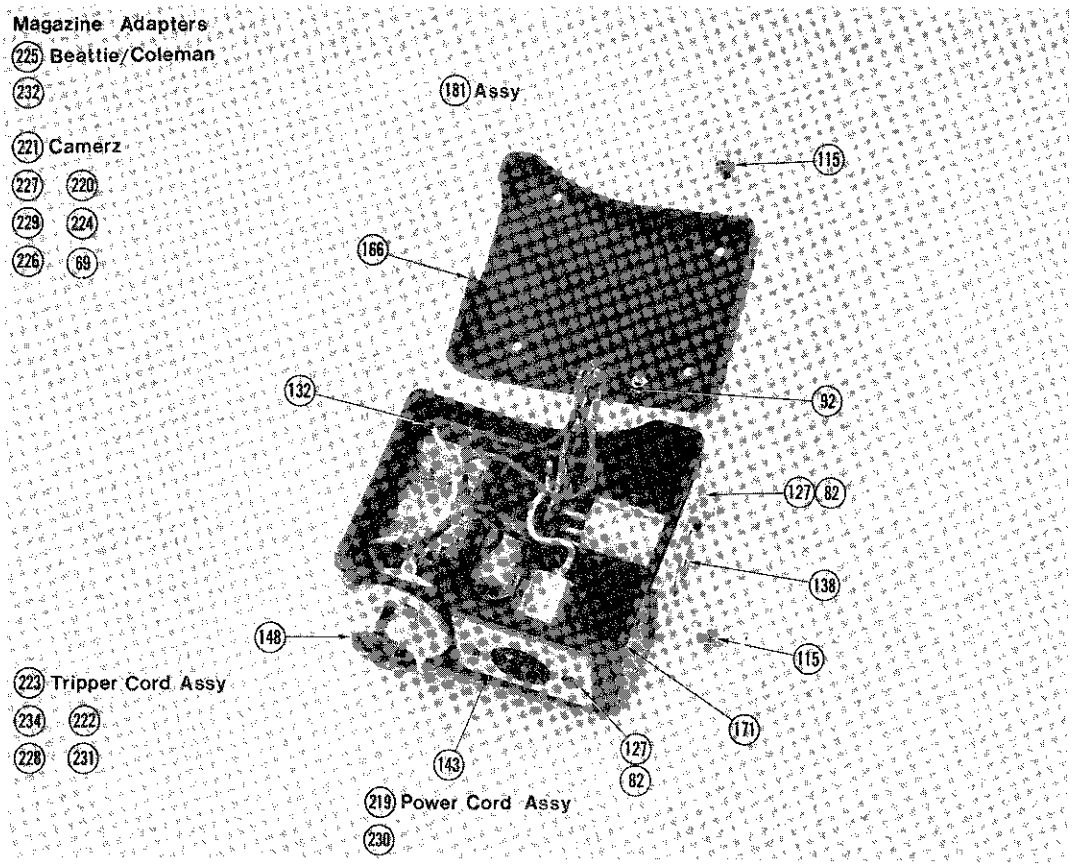
Parts Figure 4. Back Plate & Mirror



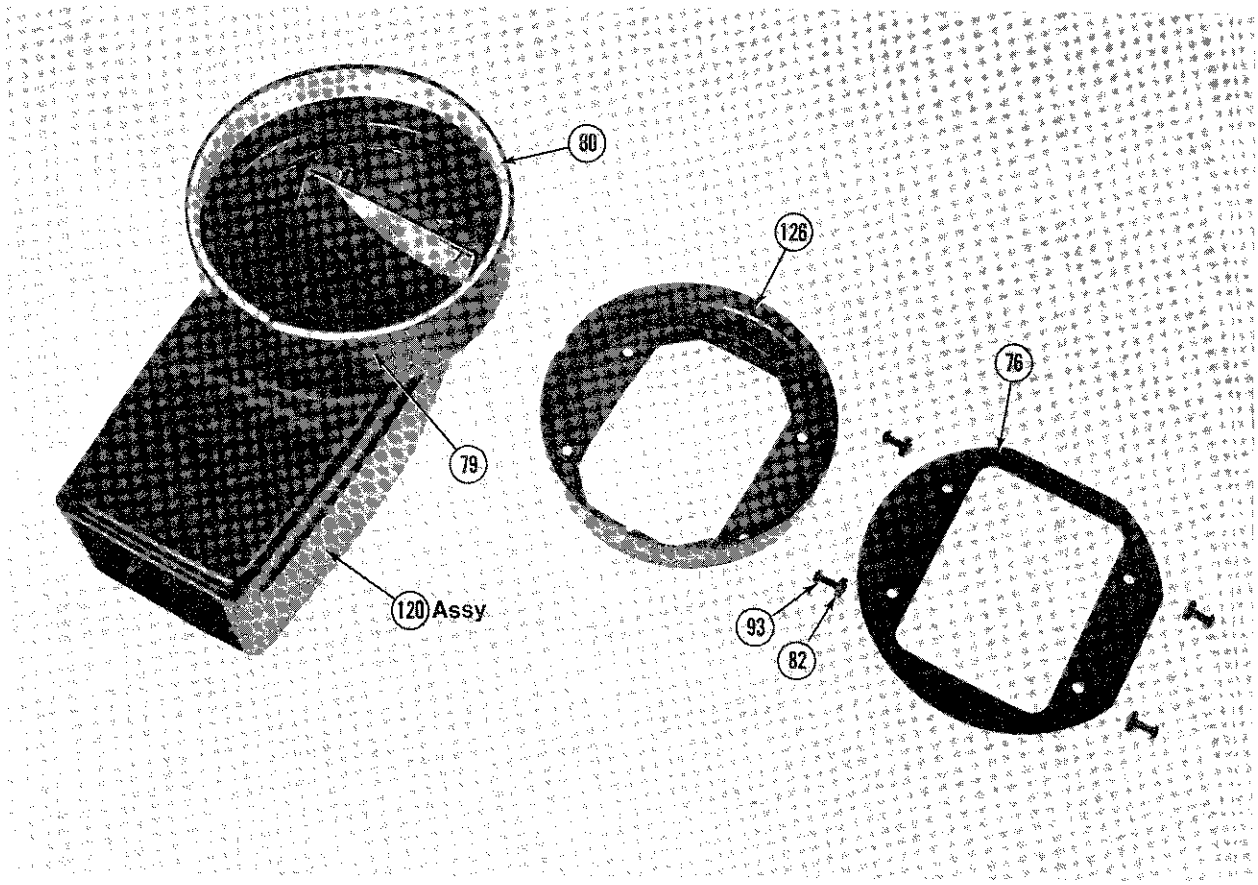
Parts Figure 5. Negative Identification System



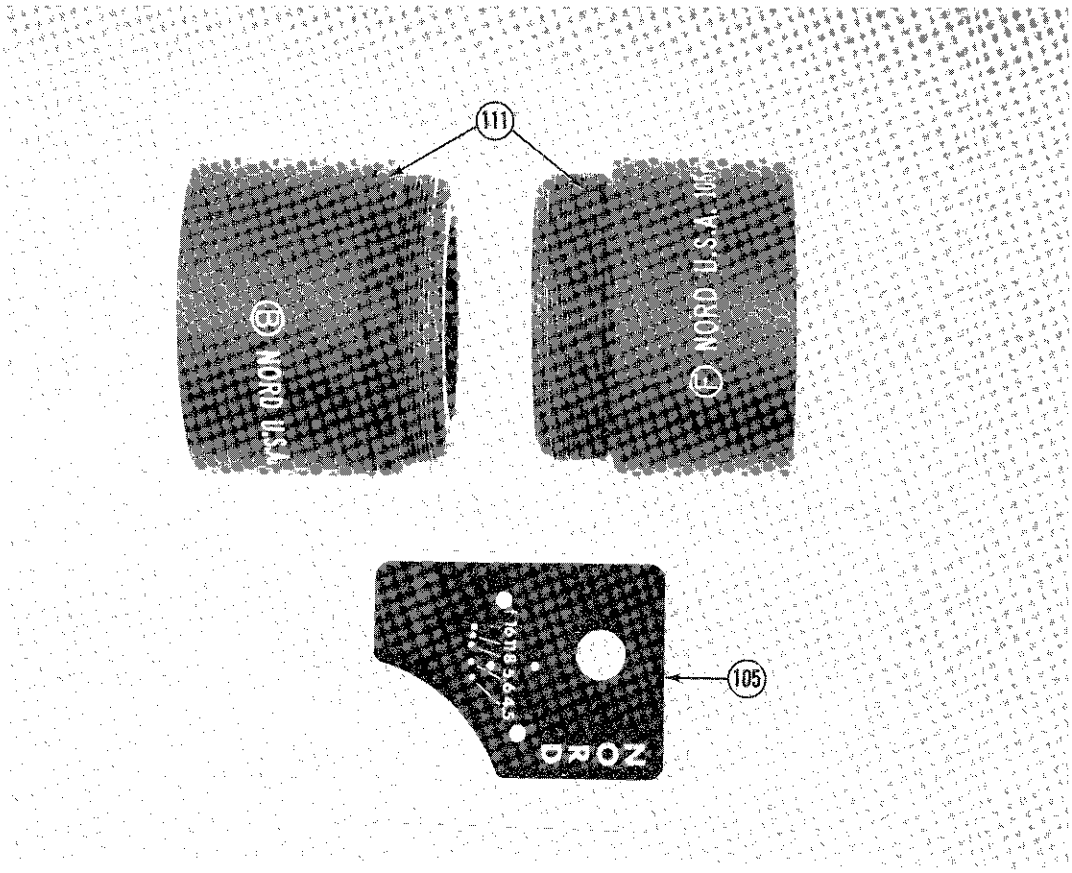
Parts Figure 6. Shutter



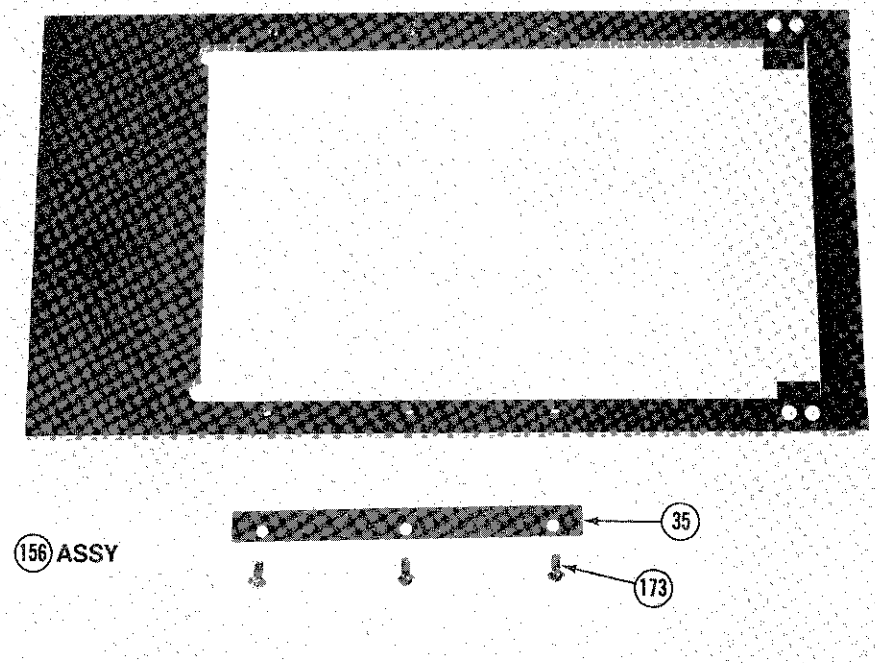
Parts Figure 7. Power Box



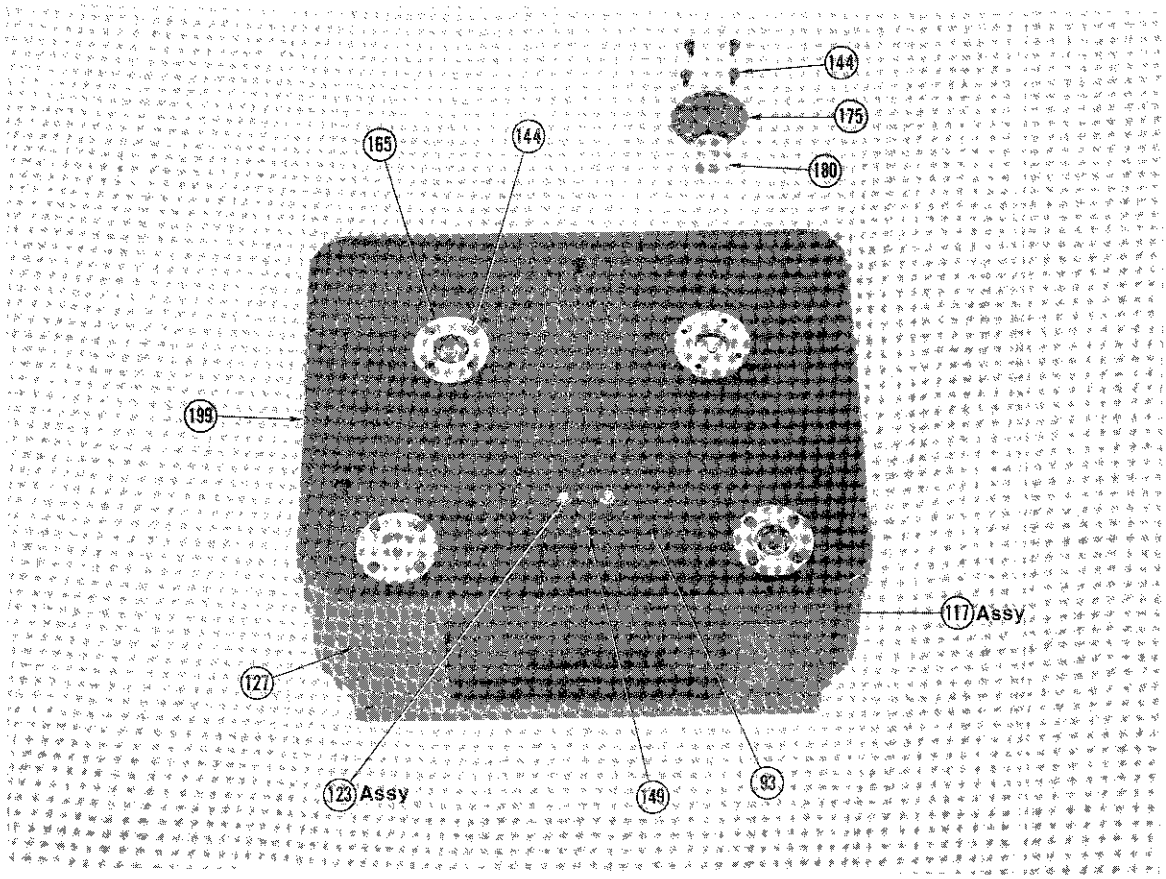
Parts Figure 8. Viewfinder

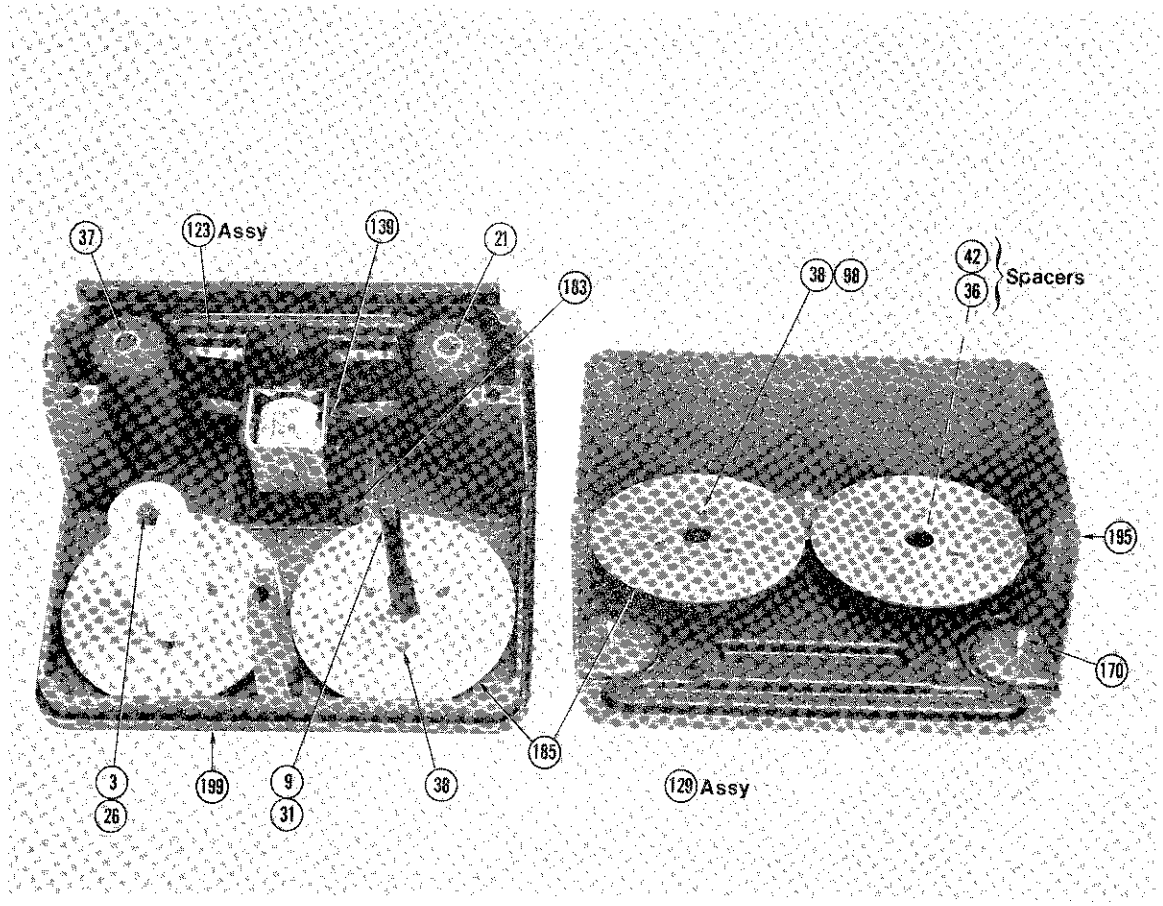


Parts Figure 9. Lenses

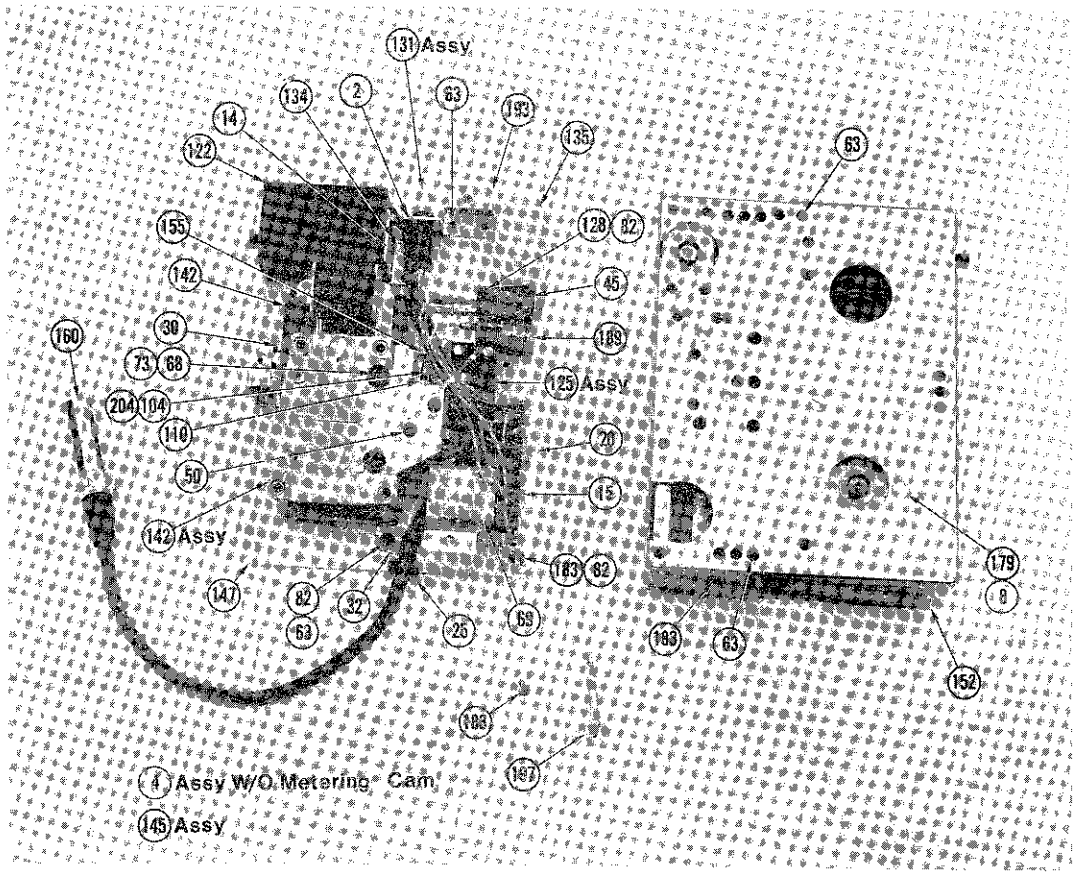


Parts Figure 10. 120 Roll Film Adapter

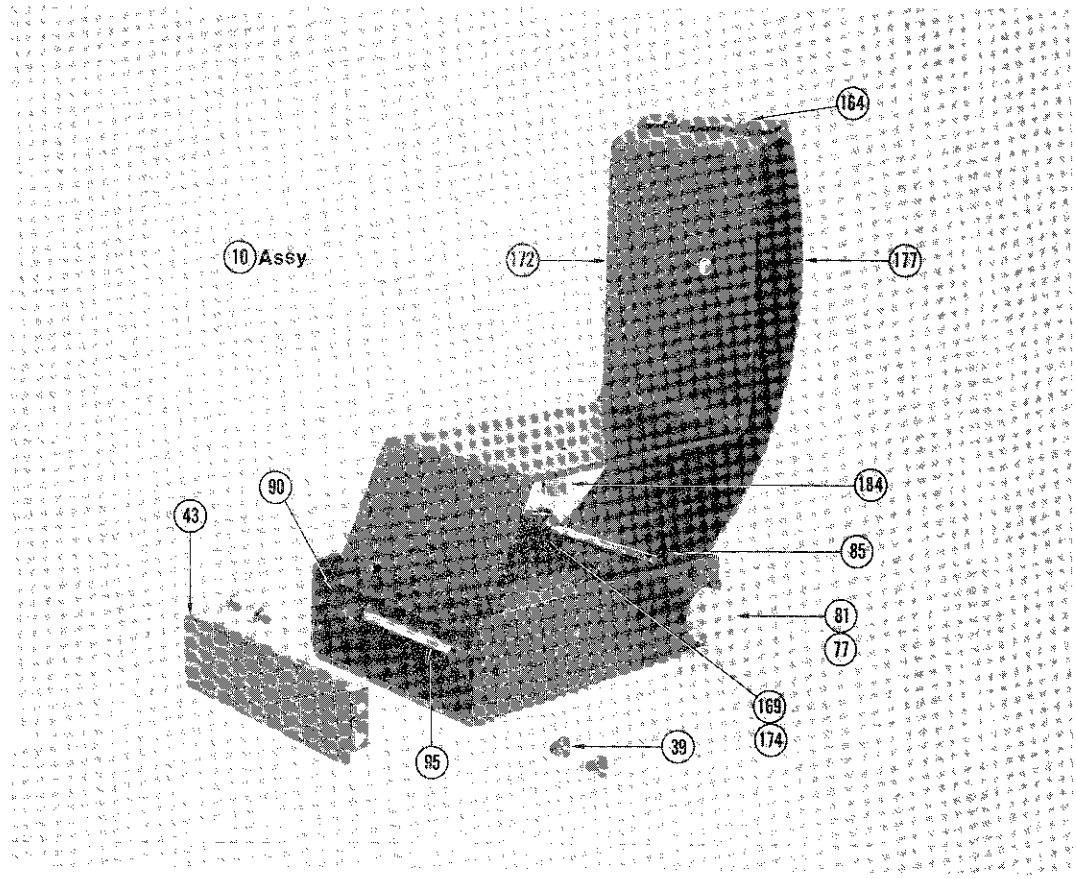




Parts Figure 11. Cassette



Parts Figure 12. Drive



Parts Figure 13. Revolving Base

CAMERA PARTS LIST

Key No.	Order By Part No.	Description
1	0051-011492	Plate, I.D. Cover
2	0051-012050	Bracket, Lamp/Switch
3	0051-021290	Take-up Shaft Assembly, except 46mm
4	0051-040738	Basic Drive Assembly, w/o Metering C.
5	0051-081373	Bearing, 1/4" shaft dia.
6	0051-011961	Guide, Periscope
7	0051-011493	Spacer
8	0051-012052	Spacer
9	0051-021291	Supply Shaft Assembly, except 46mm
10	0051-040763	Revolving Base
11	0051-081376	Screw, Pan Head 2.6 x .45 x 5mm
12	0051-011981	Light Trap
13	0051-011494	Block, Tripod Socket
14	0051-012053	Bracket, Counter
15	0051-021299	P.C. Board, Magazine
16	0051-040903	Mirror & Back Plate Assembly
17	0051-081377	Screw, Pan Head M3 x .50 x 4mm
18	0051-011982	Spring, Light Trap
19	0051-011495	Plate, Block
20	0051-012054	Bracket, P.C. Board
21	0051-021300	Metering Roller Assembly
22	0051-081316	Connector, 5 pin male
23	0051-012028	Cover Plate
24	0051-011498	Plate, Bellows
25	0051-012055	Grommet
26	0051-021326	Take-up Shaft Assembly, 46mm
27	0051-081381	Plug. Strobe
28	0051-012401	Mirror Assembly, Periscope Base
29	0051-011499	Bellows
30	0051-012058	Spring, Brake Arm
31	0051-021327	Supply Shaft Assembly, 46mm
32	0051-080141	Cable Clamp
33	0051-081382	Screw, Flat Head, M2.6 x .45 x 25mm
34	0051-012495	Gasket, Light
35	0051-011503	Clamp, Roll Holder Adapter
36	0051-012091	Spacer, 35mm
37	0051-021330	Idler Roller Assembly
38	0051-080352	Screw, Flat Head, #2-56 x 3/16
39	0051-081386	Screw, Pan Head, #4-40 x 3/16
40	0051-012525	Spacer
41	0051-011504	Pinion Gear
42	0051-012092	Spacer, 46mm
43	0051-021460	End Cap
44	0051-081342	Connector, 14 pin
45	0051-081389	Microswitch (roller)
46	0051-021288	Lamp Assembly, I.D.
47	0051-011510	Pin, Back Plate
48	0051-012130	Preview Lever Assembly
49	0051-021573	P.C. Board, Voltage Regulation
50	0051-080504	Screw, Binding Head, #6-32 x 3/16

CAMERA PARTS LIST

Key No.	Order By Part No.	Description
51	0051-081391	Relay
52	0051-021644	Mirror Assembly, Adjustable Angle
53	0051-011511	Plate Retainer
54	0051-012300	Blade, Shutter (pkg. of 5)
55	0051-021603	P.C. Board, Shutter Timing
56	0051-080511	Roll Pin, 3/32 x 1/4
57	0051-081392	Resistor, 3.6K, 1/2 watt
58	0051-080121	Hex Nut, #4-40
59	0051-011512	Spring, Periscope Retainer
60	0051-012387	Drive Clip, Mirror
61	0051-021614	Capacitor Assembly
62	0051-080659	Set Screw, #8-32 x 5/8
63	0051-081532	Screw, Flat Head M3 x .50 x 6mm
64	0051-082134	Screw, Flat Head, #4 x 1/4 ST
65	0051-011521	Cam-Spacer
66	0051-012388	Mirror Drive Assembly
67	0051-021658	P.C. Board, Driver
68	0051-080827	Screw, Pan Head, #8-32 x 1/4
69	0051-081539	Relay
70	0051-012496	Fiber Optic
71	0051-011529	Solenoid, Rotary
72	0051-012392	Wire Assembly
73	0051-080972	Washer, #8 Flat
74	0051-081547	Screw, Pan Head, #2 x 3/8 ST
75	0051-082133	Screw, Flat Head, #4 x 1/4 self tap
76	0051-011540	Base Plate
77	0051-012418	Pad
78	0051-081314	Screw, Pan Head, M3 x .25 x 25mm
79	0051-081549	Screw, Pan Head, #4-40 x 1/8
80	0051-011541	Bearing
81	0051-012419	Knob Assembly, Locking
82	0051-081315	Hex Nut, M3 x .50
83	0051-081550	Screw, Flat Head, #6-32 x 1/2
84	0051-011549	Retainer Bearing
85	0051-012421	Roller, Upper
86	0051-030735	Casting Assembly
87	0051-081316	Connector Plug, 5 pin male
88	0051-081551	Screw, Flat Head, M3 x .50 x 12mm
89	0051-011552	Clamp, Solenoid
90	0051-012423	Roller, Lower
91	0051-030736	Ring, "F" Stop Adjust
92	0051-081317	Connector, 5 pin female
93	0051-081552	Screw, Pan Head, M3 x .50 x 8mm
94	0051-011553	Spring
95	0051-012424	Shaft, Roller
96	0051-030741	Rack Support, Right
97	0051-081319	Hex Nut, Cap, #6-32
98	0051-081604	Screw, Pan Head, #2-56 x 1/4 blk.

CAMERA PARTS LIST

Key No.	Order By Part No.	Description
	0051-012056	Mask, 35mm perf. (15/16 x 1-7/16)
	0051-011537	Mask, 35mm unperf. (1-1/4 x 1-3/4)
99	0051-011535	Mask, 46mm (1-3/4 x 2-1/4)
	0051-011536	Mask, Split 70mm
	0051-012057	Mask, 2-1/4 x 2-3/4
100	0051-011554	Thumbscrew, Knurled
101	0051-012711	Linear Solenoid Assembly
102	0051-030742	Body, Camera
103	0051-081321	Knob, Focus
104	0051-081615	Roll Pin, 1/16 x 1/4
	0051-011839	"F" Plate, 105mm
	0051-011841	"F" Plate, 127mm
105	0051-011843	"F" Plate, 165mm
	0051-011845	"F" Plate, 190mm
	0051-012485	"F" Plate, 254mm
106	0051-011556	Stand-off
107	0051-012712	Contact Block Assembly, Shutter
108	0051-030745	Back Plate Assembly
109	0051-081322	Set Screw, #6-32 x 3/8 nylon
110	0051-081616	Solenoid, Linear
	0051-011799	Lens Set, 105mm
	0051-011800	Lens Set, 127mm
111	0051-011801	Lens Set, 165mm
	0051-011952	Lens Set, 190mm
	0051-011953	Lens Set, 254mm
112	0051-011563	Solenoid, Rotary
113	0051-012713	Contact Assembly, Strobe
114	0051-030750	Rack Support, left
115	0051-081323	Screw, Pan Head #4 x 1/4 self tap
116	0051-081627	Amber Lens
	0051-021305	Aperture Plate Assembly, 70mm w/I.D.
	0051-021317	Aperture Plate Assembly, 2-1/4 x 2-3/4
	0051-021319	Aperture Plate Assembly, Split 70mm w/I.D.
	0051-021321	Aperture Plate Assembly, 46mm w/I.D.
	0051-021323	Aperture Plate Assembly, 35mm (1-1/2 x 1-3/4)
117	0051-021324	Aperture Plate Assembly, 35mm (1-1/4 x 1-3/4) w/I.D.
	0051-021549	Aperture Plate Assembly, 35mm perf. w/I.D.
	0051-021318	Aperture Plate Assembly, Split 70mm
	0051-021320	Aperture Plate Assembly, 46mm
	0051-021322	Aperture Plate Assembly, 46mm (1-3/4 x 2)
	0051-021325	Aperture Plate Assembly, 35mm (15/16 x 1-7/16)
	0051-021484	Aperture Plate Assembly, 35mm (1-1/4 x 2)
118	0051-011565	Stop Bracket Assembly
119	0051-012714	Strobe Jack Assembly
120	0051-030752	Viewfinder Housing Assembly
121	0051-081324	Screw, Flat Head, #8-32 x 5/8
122	0051-081623	Counter
	0051-030879	Pressure Plate Assembly, 70mm
123	0051-031084	Pressure Plate Assembly, 35mm
	0051-031083	Pressure Plate Assembly, 46mm

CAMERA PARTS LIST

Key No.	Order By Part No.	Description
124	0051-011567	Pivot Arm Assembly
125	0051-012715	Contact Block Assembly, Drive
126	0051-030753	Base Assembly, Viewfinder
127	0051-081325	Screw, Flat Head, M3 x .50 x 10mm
128	0051-081634	Screw, Pan Head, M3 x .50 x 18mm
	0051-040605	Cassette Assembly, 35mm (1-1/4 x 1-3/4)
	0051-040607	Cassette Assembly, 46mm (1-3/4 x 2-1/4)
	0051-040742	Cassette Assembly, Split 70mm
	0051-040761	Cassette Assembly, 35mm (15/16 x 1-7/16)
	0051-040996	Cassette Assembly, 35mm unperf. (1-1/4 x 2)
129	0051-040536	Cassette Assembly, 70mm w/I.D.
	0051-040740	Cassette Assembly, 2-1/4 x 2-3/4 w/I.D.
	0051-040744	Cassette Assembly, Split 70mm w/I.D.
	0051-040747	Cassette Assembly, 46mm (1-3/4 x 2-1/4) w/I.D.
	0051-040750	Cassette Assembly, 35mm (1-1/4 x 1-3/4) w/I.D.
	0051-040854	Cassette Assembly, 35mm w/I.D.
130	0051-011572	Bracket, Spring
131	0051-012716	Lamp/Switch, Film Advance
132	0051-030846	P.C. Board, Power
133	0051-081326	Screw, Flat Head, M3 x .5 x 5mm
134	0051-081636	Screw, Pan Head, #4-40 x 1/8
	0051-021292	Metering Cam, 70mm
	0051-021293	Metering Cam, 1-3/4" Advance
	0051-021294	Metering Cam, 2-1/4 x 2-3/4
135	0051-021295	Metering Cam, 2-1/4" Advance
	0051-021296	Metering Cam, 2-1/2" Advance
	0051-021297	Metering Cam, 2" Advance
	0051-021310	Metering Cam, 1-1/2" Advance
136	0051-011579	Gasket, Bellows
137	0051-030868	I.D. System, Camera Body
138	0051-081328	Raceptacle, 4 pin female (Magazine)
139	0051-081642	Screw, Pan Head, #10-32 x 1/4
	0051-012029	Periscope, 35mm unperf. & Split 70mm
	0051-012030	Periscope, 46mm
140	0051-012034	Periscope, 70mm
	0051-012240	Periscope, 35mm perf.
	0051-012407	Periscope, 2-1/4 x 2-3/4
	0051-012410	Periscope, 120 Roll Film Adapter
141	0051-011881	Block, Contact Assembly
142	0051-030876	Motor, Advance w/break
143	0051-081329	Receptacle, 3 pin male (Power)
144	0051-081647	Screw, Pan Head, #2-56 x 5/16
	0051-040739	Drive Assembly, 70mm
	0051-040741	Drive Assembly, 2-1/4 x 2-3/4
	0051-040743	Drive Assembly, (1-3/4" Advance)
145	0051-040745	Drive Assembly, (2" Advance)
	0051-040748	Drive Assembly, (2-1/2" Advance)
	0051-040762	Drive Assembly, (1-1/2" Advance)
	0051-040746	Drive Assembly, (2-1/4" Advance)

CAMERA PARTS LIST

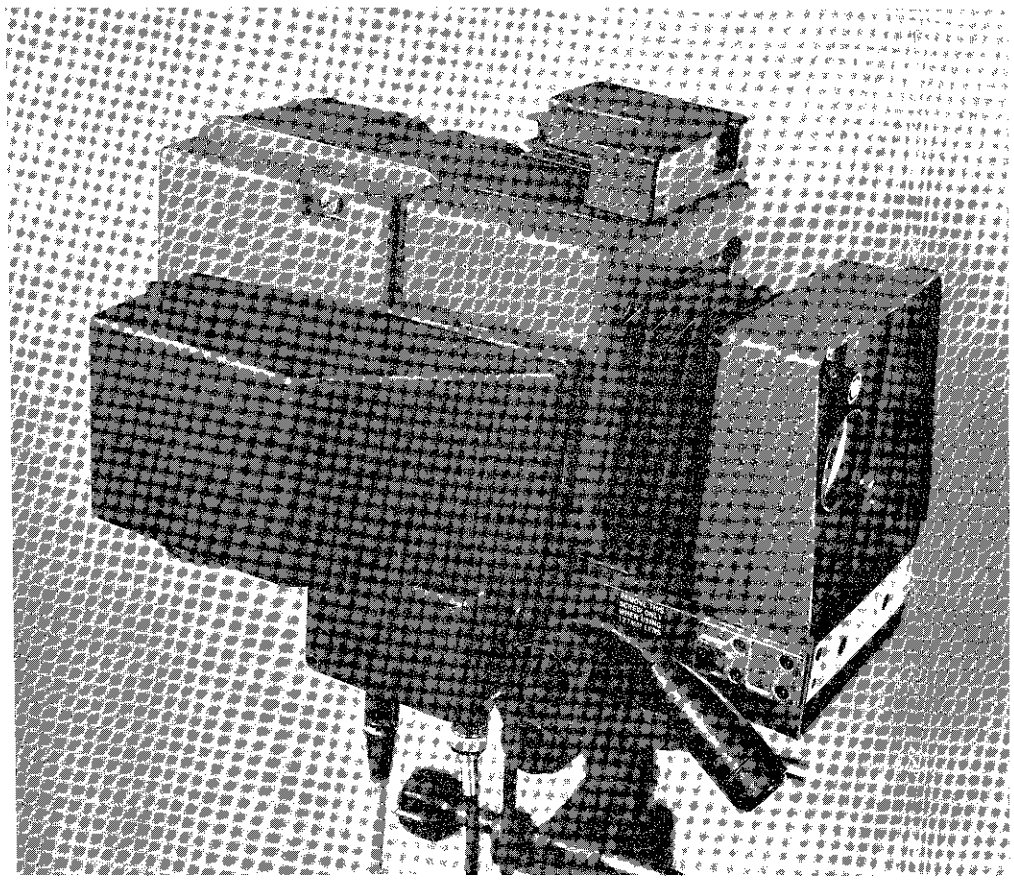
Key No.	Order By Part No.	Description
146	0051-011886	Mask Retainer
147	0051-030880	Base Plate
148	0051-081330	Receptacle, 3 pin female (Tripper)
149	0051-081648	Screw, Pan Head, M3 x .50 x 12mm
150	0051-011887	Clip, Mask Retainer
151	0051-021048	Gear Rack
152	0051-030881	Cover
153	0051-081335	Retaining Ring, 1/4 shaft
154	0051-081831	Washer, #4
155	0051-011993	Brake Arm Assembly
156	0051-021050	Adapter, 120-220 Roll Film Holder
157	0051-031093	Mirror & Housing Assembly
158	0051-081336	Bearing, 3/16 shaft
159	0051-081834	Microswitch (long arm)
160	0051-012014	Cord Assembly, Cassette
161	0051-021054	Slide Retainer
162	0051-031094	Wiring Harness Assembly
163	0051-081343	Socket, P.C. Board
164	0051-081857	Screw, Pan Head, #6-32 x 3/8
165	0051-012020	Retaining Ring
166	0051-021055	Cover, Power Box
167	0051-031095	Base Assembly
168	0051-081344	Socket, P.C. Board
169	0051-081862	Retaining Ring, 1/4 shaft
170	0051-012022	Screw, Knurled
171	0051-021056	Base, Power Box
172	0051-031124	Base
173	0051-081358	Screw, Pan Head, #2-56 x 1/8
174	0051-081863	Washer, Flat, 1/4" brass
175	0051-012024	Cap
176	0051-021060	Bracket, Solenoid
177	0051-031125	Rocker
178	0051-081360	Screw, Pan Head, M2.6 x .45 x 5mm
179	0051-081930	Screw, Flat Head, #8-32 x 3/8
180	0051-012025	Pad, Clutch
181	0051-021063	Power Box Assembly
182	0051-031148	Mirror Base Assembly
183	0051-081361	Screw, Pan Head, M3.0 x .50 x 6mm
184	0051-082035	Knurled Screw, retractable
185	0051-012026	Film Plate
186	0051-021072	Bracket, "F" Stop
187	0051-040368	Front Standard
188		
189	0051-012042	Bracket, Microswitch
190	0051-021073	Plate
191	0051 040372	Shutter Assembly
192	0051-081369	Screw, Pan Head #3-48 x 1/8
193	0051-012048	Bracket, Cover Mounting
194	0051-021074	Drive Ring
195	0051-040542	Cover, Cassette

CAMERA PARTS LIST

Key No.	Order By Part No.	Description
196	0051-081370	Washer, #2 Flat
197	0051-012049	Screw, Knurled
198	0051-021075	Bracket, Solenoid
199	0051-040721	Base Casting
200	0051-081372	Knob, 1/4 shaft
201	0051-080158	Hex Nut, #6-32
202	0051-081349	Connector, 14 pin male
203	0051-040373	Cover, Front
204	0051-012004	Bell Crank
205	0051-082041	Connector, 2 pin
206	0051-080361	Washer, Lock #2, Int.
207	0051-080356	Hex Nut, #2-56
208	0051-080567	Screw, Round Head, #2-56 x 3/16
209	0051-080184	Screw, Binding Head, #4-40 x 1/8
210	0051-080589	Washer, Flat, #2
211		
212	0051-041014	Mirror & Back Plate Assembly, w/I.D.
213	0051-021742	Mirror Assembly
214	0051-082135	Screw, Flat Head, #2-56 x 3/8
215		
216		
217	0051-012380	Plate, Microswitch
218	0051-012520	Plate, Microswitch
219	0051-021062	Power Cord Assembly
220	0051-080029	Diode, #IN4820, 1 amp
221	0051-021233	Adapter, Camerz (series D)
222	0051-081355	Switch
223	0051-021065	Tripper Cord Assembly
224	0051-081160	Wire Nut
225	0051-021232	Adapter, Beattie/Coleman D108, D56, F80, C54
226	0051-081533	Connector
227	0051-081311	Connector, 4 pin male
228	0051-081356	Cap
229	0051-081534	Connector
230	0051-081350	Plug, 3 pin female
231	0051-081357	Housing, Switch
232	0051-081537	Connector
233	0051-081539	Relay, 110 VDC
234	0051-012820	Cord

NORD®
PHOTO ENGINEERING, INC.
529 South 7th Street, Minneapolis, Minnesota 55415

MODEL II
SLR CAMERA



SUPPLEMENT MANUAL

(TO BE USED WITH MODEL I MANUAL)

FORM 683

Litho in U.S.A.

Preface

This is a supplement to the existing Automatic SLR camera manual (Form 553). Contained herein are major modifications which are of special interest to Model II camera owners.

Contents

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Identification System (installation)	1-9
Power Box	10-11
Viewfinder Mask (installation)	12-13
Viewfinder Housing Assembly	14-15

Identification System

INTRODUCTION

Image frames on roll film used with the Nord SLR Roll Camera can be identified using either of two optional identification (I.D.) systems.

Negative I.D.System allows information to be recorded in a space between image frames. Information to be recorded on film is printed in a 3/8 in X 2 1/4 in. space on a I.D.* card. Prior to exposure this card is inserted into card holder (top of camera). Card information is projected through a periscope onto the image frame during exposure.

Pose I.D. System similiar to the negative I.D. system, but provides individual pose identification. A pose character (A thru K except I) and I. D. card information in a (3/8 in. X 1 7/8 in. space)* is projected through a periscope onto the image frame during exposure. The pose characters advance automatically after each exposure. Manual advance button is provided for re-orientation of pose characters.

Each film size requires a matching periscope. If no identification is necessary, then a "dummy" periscope must be used to prevent the film from fogging.

Note: All Model II cameras are wired for easy installation of I.D. systems. No soldering is required.

UNPACKING

Immediately upon shipment arrival, unpack the contents of the carton and compare items received with the packing list, and the original order. Inspect for any visible damage. If a claim is necessary, file it immediately with the carrier.

Caution: Do not lift camera by pose I.D. cover, viewfinder or front projection mounting bracket. Always lift using both hands beneath main body of camera.

Tools required for I.D. System Installation

.Phillips screwdriver
.3/16 flat blade screwdriver
.Needle nose pliers

Special Notes

.Use I.D. equipped cameras with I.D. equipped magazines, and a periscope.
.Use non-I.D. cameras with non-I.D. magazines, and no periscope.
.In emergency cases, a non-I.D.magazine may be used with an I.D. camera. However, no periscope is to be used, otherwise part of the image will be blocked. No data can be recorded with this combination.
.An I.D. magazine (having a longer film advance) could be used with a non-I.D. camera. However, this combination wastes the space that would normally be filled with I.D. data.

Negative I.D. Attachment Assembly

A. Disassembly of camera Prior to Installation.

1. Detach film magazine if afixed to camera (see step E of Assembly section in manual and reverse the order of the steps).
2. Pull out back plate and mirror assy. by removing the six phillips screws (see Parts Fig. 3 in manual).
3. Lay back plate and mirror assy. so that the plate is face down.

   CAUTION: Handle back plate and mirror assy. with care. Avoid fingerprints on mirrors and ground glass.

   It is not necessary to disconnect the connector joining the main camera body with the back plate.

4. Lift off the cover plate from the top of the camera by first removing five screws. Leave the gasket in place.

The camera is now ready for the negative I.D. attachment. Check to make sure you have all the necessary parts.

B. Installation of Negative I.D. Attachment System.

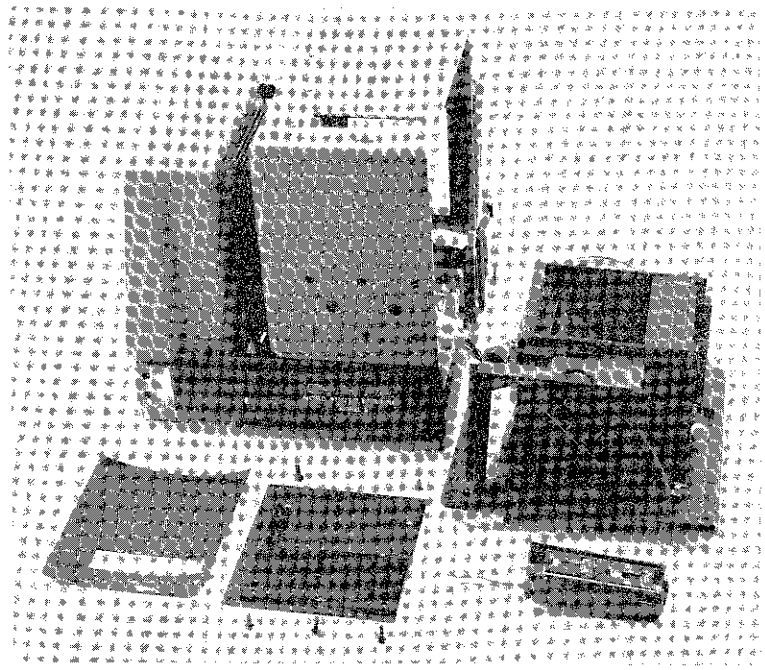


Fig.1
NEGATIVE I.D. ATTACHMENT ASSEMBLY. (Neccessary parts layed out before installation).

Upon receiving the assembly, you will find the card holder completely assembled. All that is shipped loose are the screws necessary for fastening the card holder to the camera, and the lamp housing assembly (see the parts list).

1. Lamp Housing assembly.
   a. Slide the lamp housing assembly into the holder located next to the mirror assembly (see fig.2). Insert so that the bulbs are facing the mirror.

      (Note: Do not pull housing by wire leads.)

   b. Join the female connector on the lamp assembly with the male connector leading from the camera.
   c. Reinstall the back plate to the camera housing using the six phillips screws.

      Note: Before doing so, you may want to change masks if the film size necessitates it (see mask change supplement).

      Caution: When reinstalling the camera back, be careful of clearances between the bottom of the mirror assembly and the printed circuit boards. Also be sure that no plugs or wiring protrude into the optical path.

2. Card Holder
   a. Position gasket over opeing in the camera top.
   b. Place assembly on top of gasket. Line up the holes in the card holder plate with those in the gasket and camera top.
   c. Insert the five screws shipped loose with the attachment (see Fig. 1 for screw placement) and tighten just enough so as to make it snug.

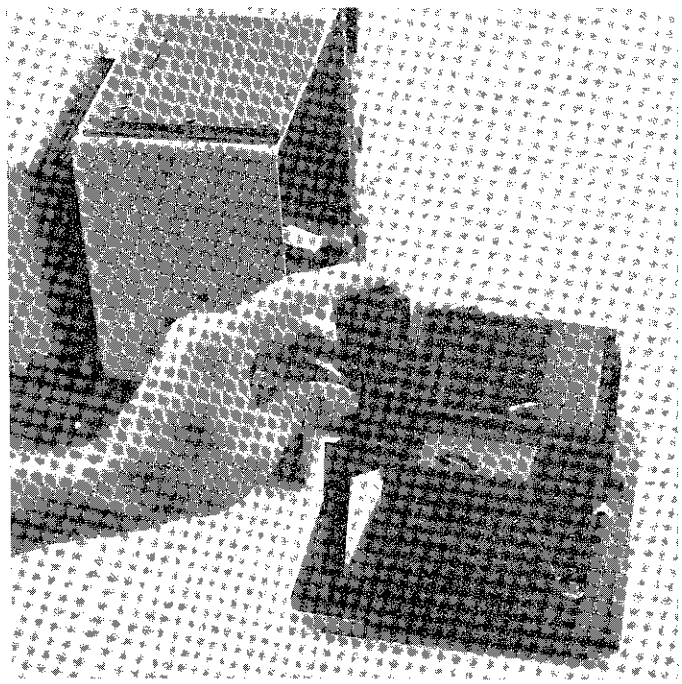


Fig. 2
INSTALLING I.D. HOUSING ASSEMBLY.

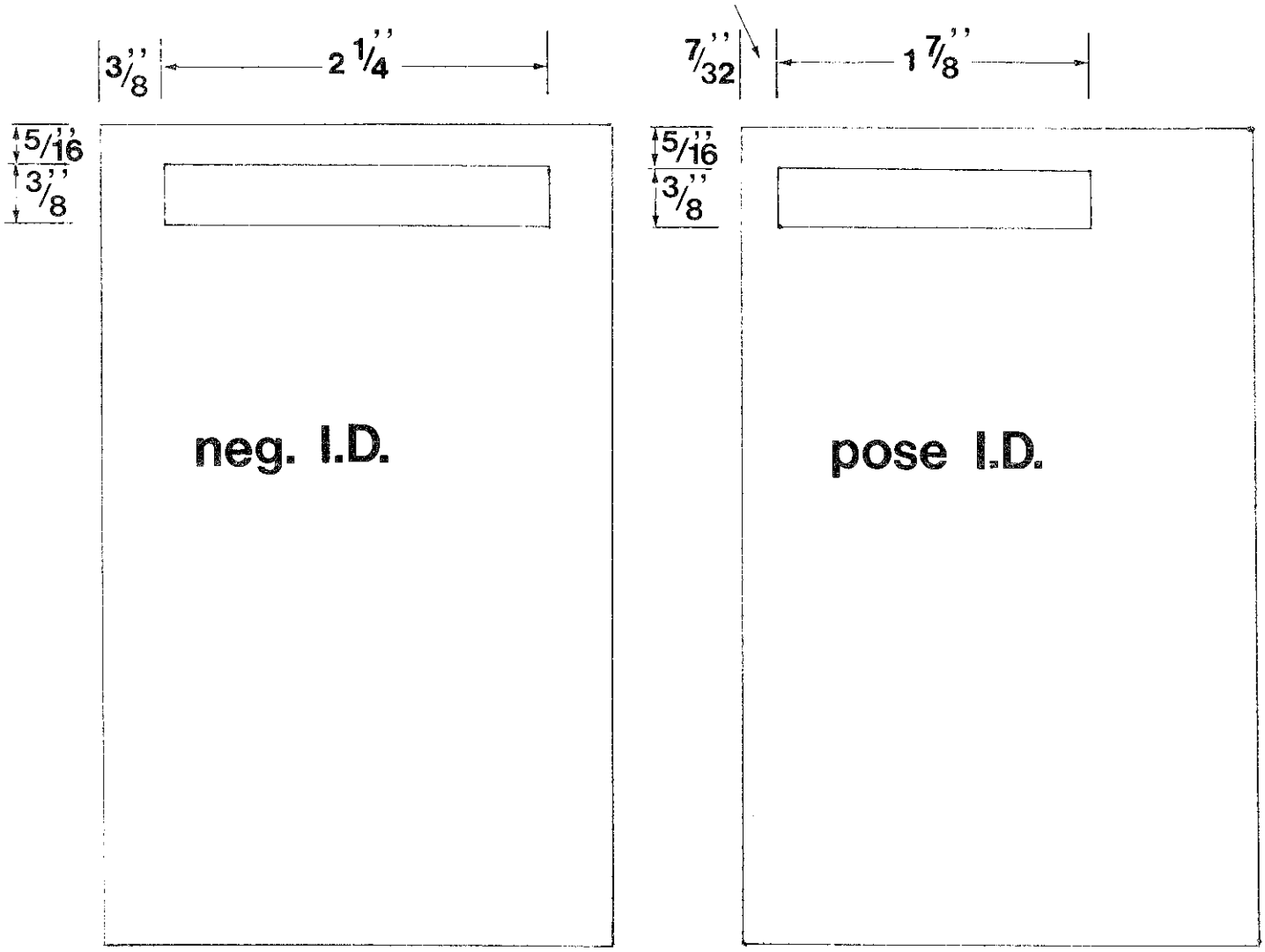
C. Installing Negative I.D. Periscope.

1. Select the correct periscope for the film size used (size is marked on the periscope body).
2. Insert the periscope in the opening beneath the bronze locking strip on the camera back plate, and push it upward until the strip locks with an audible click.

   For removal, gently lift the strip while pulling downward on the periscope.

D. I.D. Card Format.

Identification data is most conveniently written on a 3 x 5 index card. The area reproduced on film is shown in the diagrams below:



Above illustration shows card layouts for Model II I.D. system.

E. Using the Negative I.D. System.

1. Install the proper size periscope (see step C above).
2. Insert an I.D. data card face down in the card slot on top of the camera.
3. Make an exposure. A green indicator on the camera back will light, indicating exposure of the data.

Pose Counter Assembly

A. Disassembly Prior to Installation.
(see step A of Negative I.D. installation)

B. Installation of Pose Counter System.

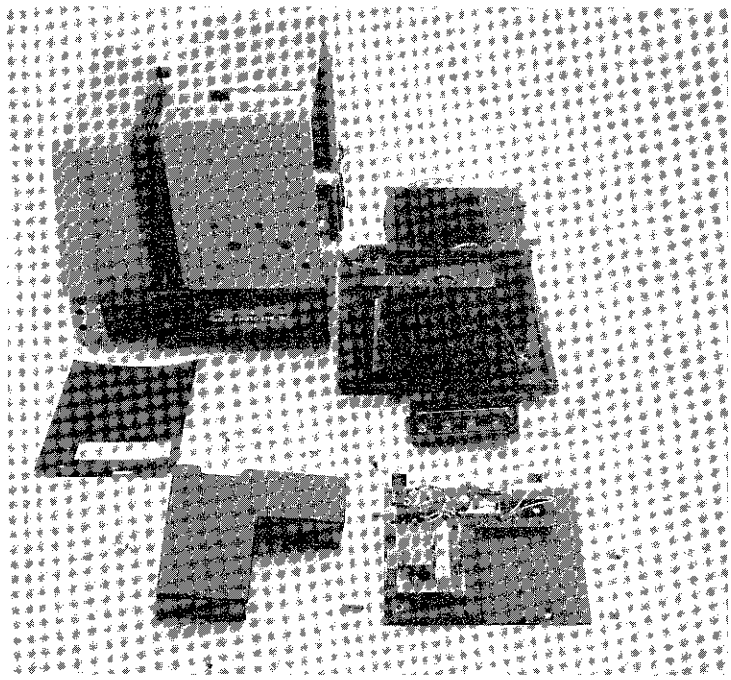


Fig.3
POSE COUNTER ASSEMBLY. (Neccessary parts layed out before installation).

Upon receiving the pose counter assembly, you will find the most parts have already been assembled. (see the parts list on the following page).

However, the cover is attached to the pose counter when shipped. Therefore, remove the cover (four screws and a switch collar) before installing to the camera. Use a needlenose pliers to unscrew the collar on the reset button.

1. Lamp Housing assembly.
(see step B-1 of Negative I.D. installation).

2. Pose counter.

Note: The pose counter should be handled with care, since certain parts could be easily damaged. Take note also of the four-pronged male connector located on the bottom of the counter base plate. Again, avoid mishandling.

a. Position the gasket over the lamp opening in the camera top.
b. Guide the four-prong connector on the bottom of the pose counter assembly into the female plug-in on the camera top. Press down gently until the assembly base plate seats on top of the camera.
c. Line-up the holes in the base plate with those in the gasket.

CAUTION: Be careful not to twist the counter assembly while plugged into the camera top. This could damage the prongs on the connector.

d. Insert the four screws shipped loose. (see parts list) Tighten just enough so as to make it snug.

Note: If you have access to an offset screwdriver, use it to tighten the phillips screw beneath the solenoid.

e. Check to make sure the rachet mechanism is working properly. To do so, press the rachet escapement (see fig. 4) towards the solenoid several times. Observe if the rachet wheel turns to each consecutive letter as the excapement is pressed each time.
f. Afix counter assembly cover by lining up the four holes in the cover with the four hold-down bracket holes on the counter assembly. Use the 2-56 x 3/16 screws, and tighten gently.
g. Replace the collar for the reset button.

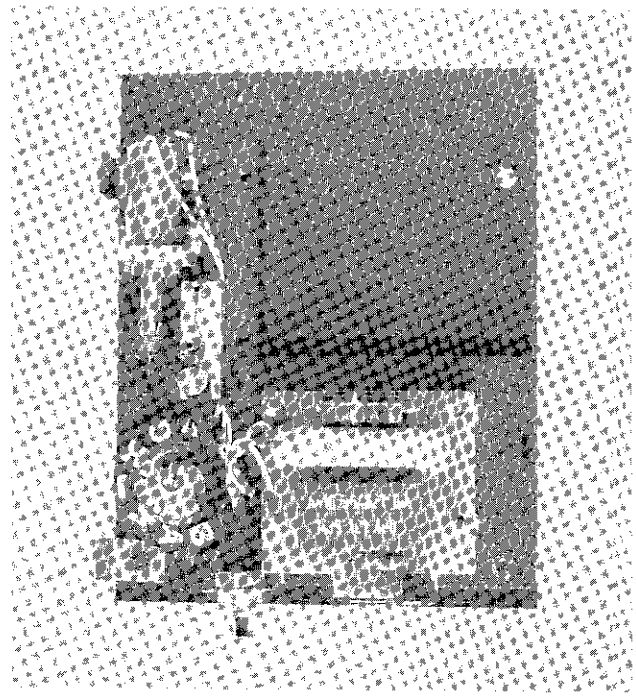


Fig.4
POSE COUNTER (showing rachet assembly).

C. Installing the I.C. Periscope.
(see step C of Negative I.D. installation)

D. I.D. Card Format.
(see step D of Negative I.D. installation)

E. Using the Pose I.D. System.

Before proceeding, be sure the camera is plugged in for power.

1. Install the proper size periscope (see step C of Negative I.D. installation).
2. Make sure the rachet mechanism is working properly. Push the reset button on the counter and release so that the rachet wheel is set on the letter A (as it appears through the view window in the counter cover). Now trigger the camera tripper several times to make sure the rachet wheel turns to a new letter for each exposure.

   (It is advised that you check the escapement arm on the rachet assembly before the cover is replaced. The excapement arm on the letterwheel gear teeth should seat firmly for each movement).

3. Insert an I.D. data card face down in the card slot on top of the camera.
4. Push the reset button and release until the letter A appears in the window.
5. Make an exposure. A green indicator on the camera back will light, indicating exposure of the data.

PARTS LIST

Negative I.D. Attachment Assembly includes the following parts:

Part No.	Quantity		Description
0051-022262	1	A	Base Plate
0051-013709	1	A	Stop Bar
0051-013708	1	A	Guide Bar
0051-011981	1	A	Light Trap
0051-011982	1	A	Spring
0051-013719	1	A	Cover Plate
0051-081358	2	A	Screw, 2-56 x 1/8 lg. Pan Hd.
0051-081690	4	A	Screw, 2-56 x 3/16 lg. Pan Hd.
0051-080539	3	L	Screw, 4-40 x 3/8 lg. Pan Hd.
0051-080612	1	L	Screw, 4-40 x 5/16 lg. Pan Hd.
0051-080348	1	L	Screw, 4-40-x 1/4 lg. Phillips
*0051-021288	1	L	Lamp Housing Assy., ID.

Note: The cover for the counter assembly is secured to the assembly when shipped. When installing, the cover, three screws, and a retaining nut on the switch must be removed.

Pose counter assembly includes the following parts:

Part No.	Quantity		Description
0051-031914	1	A	Base Plate
0051-012917	1	A	Card Guide
0051-021784	1	A	Pose Rachet Assembly
0051-022303	1	A	Card Cover Assembly
0051-012918	1	A	Light Trap
0051-013715	2	A	Hold Down Brkt.
0051-021953	1	A	P.C. Board Assy.
0051-031916	1	A	Cover
0051-013710	1	A	Switch Mtg. Brkt.
0051-082190	1	A	Nut, Decorative, Grayhill #23-1
0051-080660	2	A	Screw, 2-56 x 1/8 lg.,Slotted Hd.
0051-080352	5	A	Screw, 2-56 x 3/16 lg.,Slotted Hd.
0051-081690	6	A	Screw, 2-56 x 3/16 lg. Pan Hd.
0051-080184	3	A	Screw, 4-40 x 1/8 lg. Slotted Button
0051-080348	3	L	Screw, 4-40 x 1/4 lg. Flat Hd.Phillips
0051-081387	1	L	Screw, 4-40 x 1/2 lg., Slotted Pan Hd.

*Necessary for both I.D. systems
Ordered separately for pose counter assembly.

L shipped loose
A assembled

Power Box

120 Volt....0051-031922
240 Volt....0051-031923

The power box (120 volt or 240 volt available) serves both as the power control to the camera, and as a junction box. Located below and adjacent to the viewfinder, the bower box has seperate receptacles for each of the following camera connections: Tripper cord, film magazine, and power cord.

Although assembled to the camera when shipped, the power box can be easily removed for convenience of servicing.

A circuit breaker reset button is located on the front side of the box.

1. Power box removal.

   CAUTION: Disconnect the power from the outlet before proceeding.

   When removing the power box for service, or when changing power requirements, perform the following steps:

   a. Remove the viewfinder for ease of working space (see Viewfinder section).
   b. Place the camera left side down (side opposite the viewfinder). Observe that the box is mounted to the bottom side of the side rail by means of a mounting bracket. Remove the two screws from the bracket.
   c. A female connector on the side of the power box plugs into a male connector on the camera. Use care when removing the power box to avoid damaging the connector.
   d. Gently lift up on the side of the box where two receptacles are side by side. The power box connector is located near this side.
   e. While lifting the connector side of the box away from the camera, at the same time slide out the opposite side of the power box mounting bracket (L-shaped bracket feet) from under the hold-downs (see Fig.**5**).

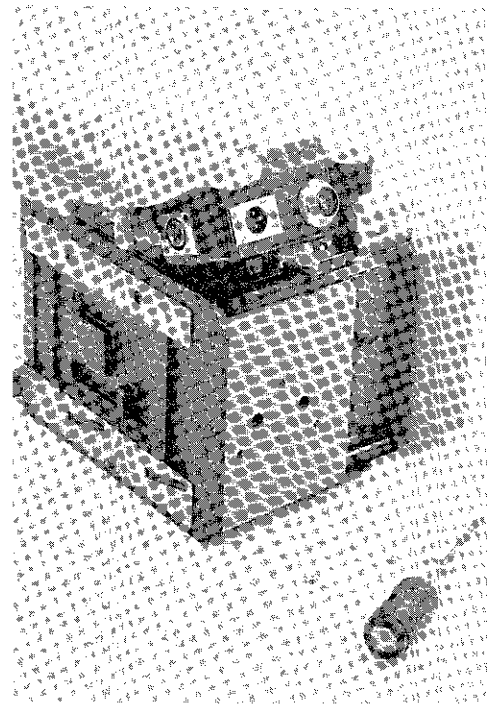


Fig.5
REMOVING POWER BOX.

2. Replacing power box on camera.

   a. Slide bracket feet under the hold-downs while simultaneously aligning and lowering power box into the camera connector mate.
   b. Push the connectors together until the box is tight against the camera body.
   c. Replace the two screws holding the power box bracket to the bottom side of the side rail.

When in doubt about a camera problem, consult a local NORD representative for assistance.

Viewfinder Mask

Changing viewfinder masks no longer necessitates removing the back plate from the camera. Access is now possible through the viewfinder base.

A viewfinder mask matching the film format must be installed at the ground glass surface (except for 70mm, for which none is needed). The size of the mask aperature must match the film format/image size. The table below lists the aperature sizes for ease of identifying masks.

To install a mask:

1. Select the correct mask for the film size used from the table below.

Viewfinder mask aperature sizes

	Full 70mm..... No mask required
0051-013636	Ideal format.. 2-1/4 in. x 2-3/4 in.
0051-013638	Split 70mm.... 1-3/4 in. x 2-3/4 in.
0051-013637	46mm..... 1-3/4 in. x 2-3/4 in.
0051-013639	35mm unperf... 1-1/4 in. x 1-3/4 in.
0051-013640	35mm perf..... 15/16 in. x 1-7/16 in.

2. Remove the viewfinder.
3. Remove the two screws from the field lens frame. Lift the lens assembly off of the viewfinder base.

CAUTION: Be careful not to scratch or soil the lens. Grasp by the sides of the lens.

4. Now you have access to the ground glass surface. The selected mask will rest on the frame of the ground glass.
5. Grasp the mask by the attached knob. (see Fig. **6**). Place the selected mask so that one edge seats against the two locating posts opposite the nylon hold-in clip.

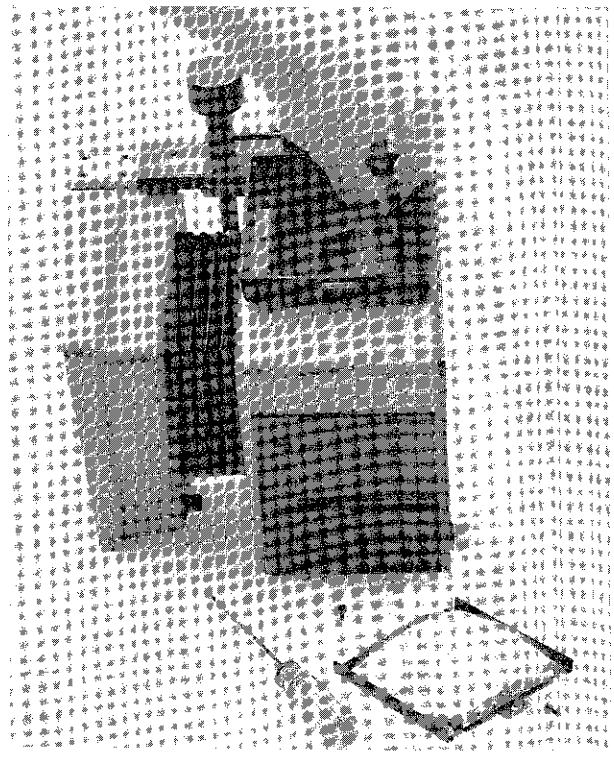


Fig.6
INSTALLING VIEWFINDER MASK.

CAUTION: Handle with care so as not to mark the ground glass surface.

6. Press down the other edge so that it locks in under the clip. The mask is held in place also by the four locating posts, one at each corner of the mask.
7. Replace the field lens assembly. (No need to be concerned about reinstalling backwards.
8. Reattach the viewfinder.

Note: Before replacing field lens, be sure no particles are on the ground glass surface.

Viewfinder Housing Assembly
(0051-031976)

The Viewfinder Housing Assembly for the Model II SLR camera is now easily removed for fixing in any of three different positions. In addition, each viewfinder housing is manufactured with a magnifier assembly already attached.

To reposition the viewfinder housing:

1. Depress one of the housing lock buttons with your thumb while at the same time gripping the top of the housing. This disengages one of the two housing locks from the viewfinder base slot.
2. Still holding the one button in, lift the disengaged side of the housing up and slide out the opposite locking wing from the base slot.(See figure below)
3. When repositioning the housing, always slide one locking wing into its mated slot first and then depress the opposite button, and drop that side into place.
4. Release the button. The viewfinder housing is now locked into the base.

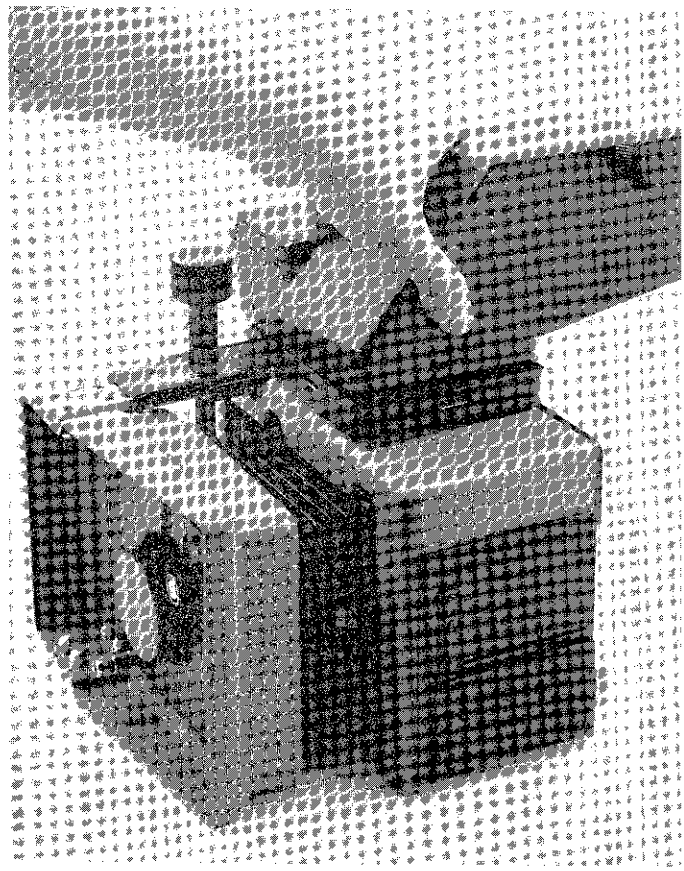


Fig.7
VIEWFINDER HOUSING ASSEMBLY. (Removing viewfinder hood from base).

Parts List

Part No.	Quantity	Description
0051-031970	1	Viewfinder Hood Assembly.
0051-013248	1	Viewfinder Mirror.
0051-013811	1	Lens Holder Stiffener Spring Assembly.
0051-013831	1	Lens Holder Assembly.
0051-013810	1	Flipper Lens Bar.
0051-082757	1	Knob Control.
0051-013817	1	Lens Holder Adjustment Plate.
0051-081358	2	Screw, No. 2-56 X 1/8 lg.
0051-081604	3	Screw, No. 2-56 X 1/4 lg.

NORD® PHOTO ENGINEERING, INC.

NORD MODEL II CAMERA SCHEMATIC

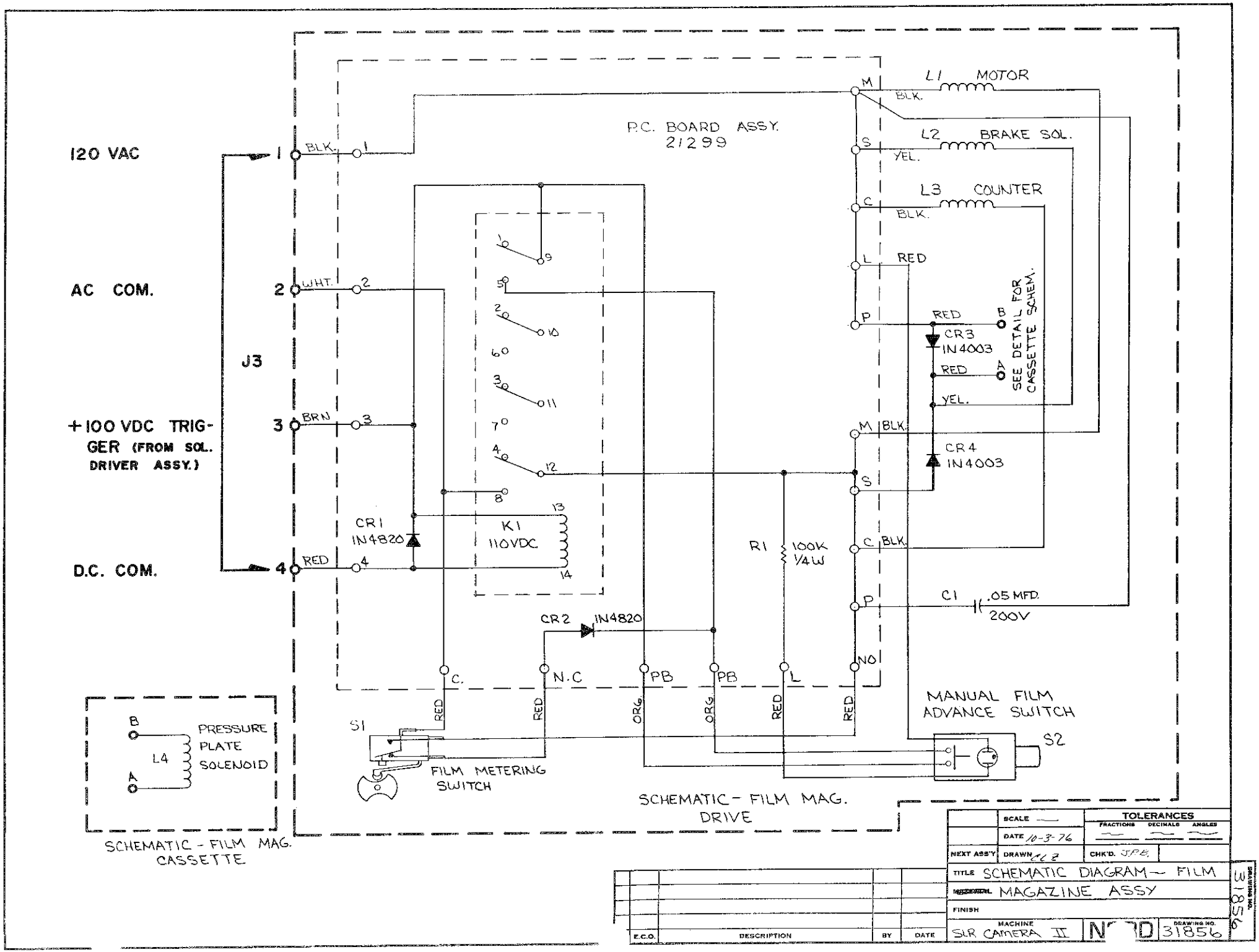
AND WIRING DIAGRAM SET

MANUAL SUPPLEMENT

FORM 866

April 25, 1979

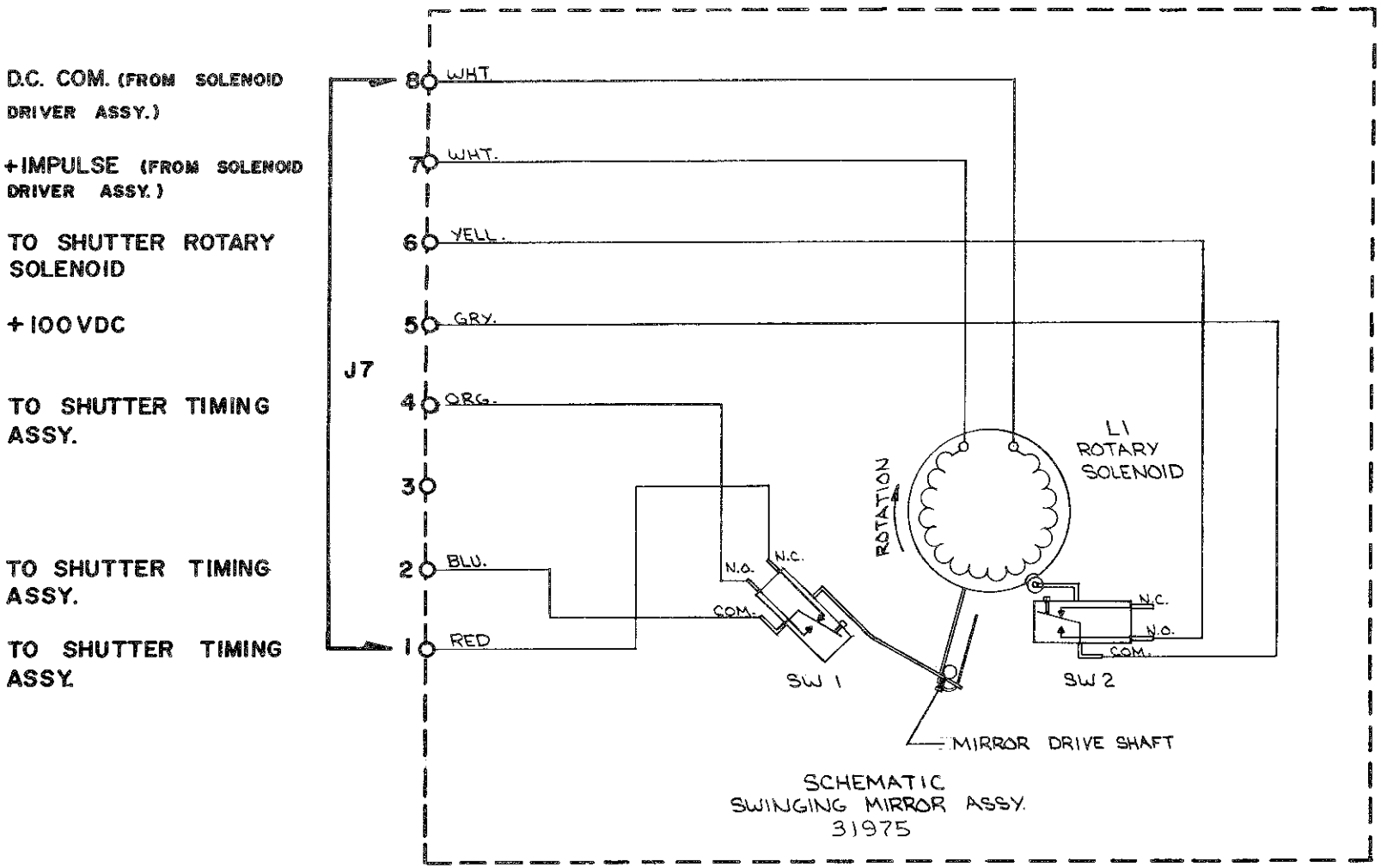
529 So. 7th Street, Minneapolis, Minnesota 55415 • Phone: (612) 338-0781 • Telex: 29-0226



	SCALE	TOLERANCES	
	DATE 10-3-76	FRACTIONS	DECIMALS ANGLES
NEXT ASS'Y	DRAWN	CHK'D. JPB	
TITLE SCHEMATIC DIAGRAM — FILM			
MATERIAL MAGAZINE ASSY			
FINISH			
MACHINE SLR CAMERA II		NORD	DRAWING NO. 31856

E.C.O.	DESCRIPTION	BY	DATE

31856

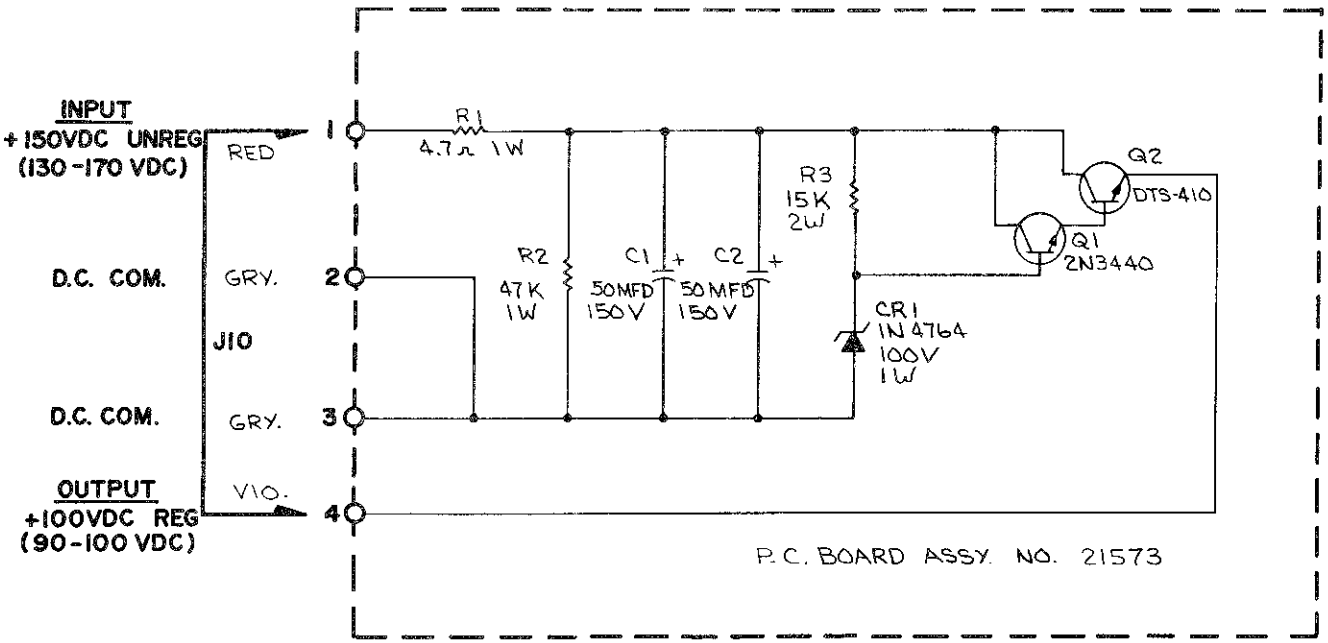


SCHEMATIC
SWINGING MIRROR ASSY.
31975

E.C.O.	DESCRIPTION	BY	DATE

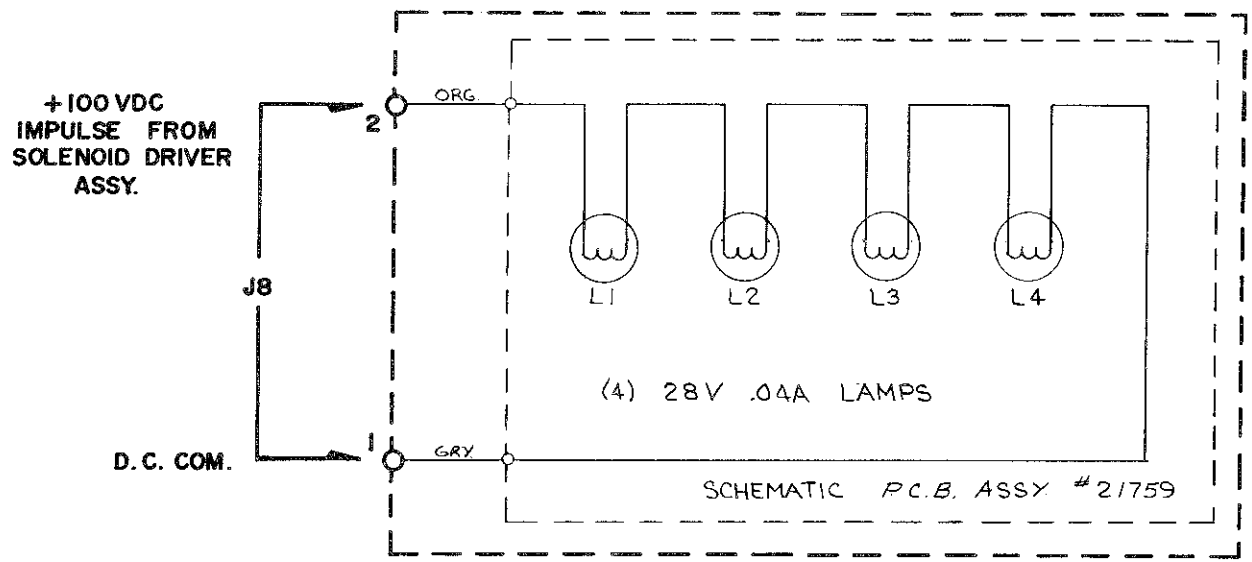
	SCALE	TOLERANCES: FRACTIONS, DECIMALS, ANGLES
31975	DATE 10-22-76	
NEXT ASS'Y	DRAWN CLT.	CHK'D. JPB
TITLE	SCHEMATIC DIAGRAM	
	SWINGING MIRROR ASSY.	
	# 31975	
MACHINE	SLR CAMERA II	N / D
DRAWING NO.	31858	

31858



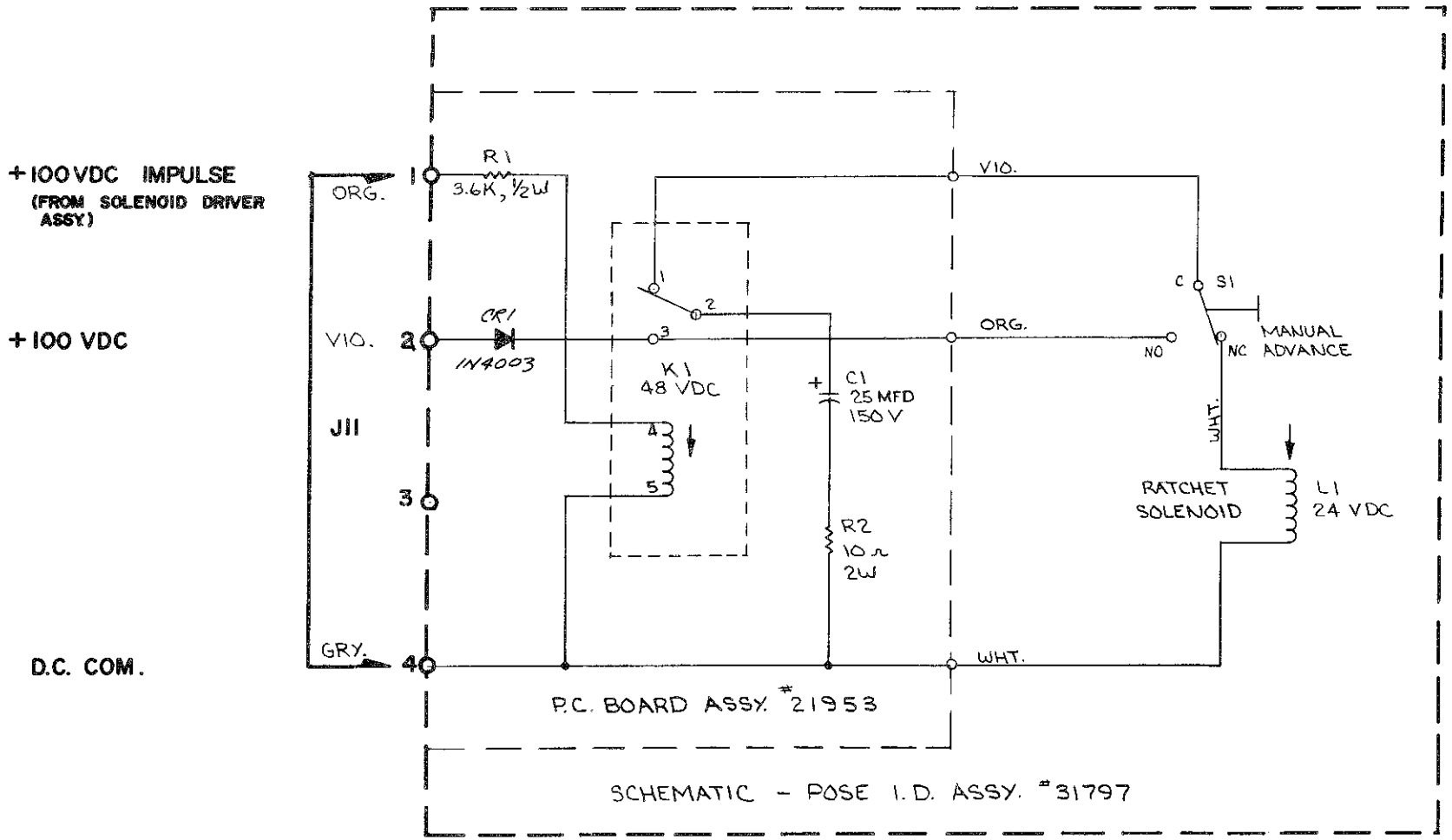
				SCALE ~	TOLERANCES: FRACTIONS, DECIMALS, ANGLES
				21573 DATE 10-13-76	
				NEXT ASS'Y DRAWN CLZ	CHK'D. JPB
				TITLE SCHEMATIC DIAGRAM - POWER	
				~~MATERIAL~~ REGULATOR P.C. BOARD	
				FINISH	
E.C.O.	DESCRIPTION	BY	DATE	MACHINE SLR CAMERA II	N / D DRAWING NO. 31861

31861



	SCALE NONE	TOLERANCES FRACTIONS DECIMALS ANGLES	
21288	DATE 10-12-76		
NEXT ASS'Y	DRAWN CLZ.	CHK'D. JPB	
TITLE SCHEMATIC DIAGRAM FOR			DRAWING SIZE 31862
MATERIAL LAMPHOUSE ASSY #21288			
FINISH			
MACHINE SLR CAMERA	N(	D	DRAWING NO. 31862

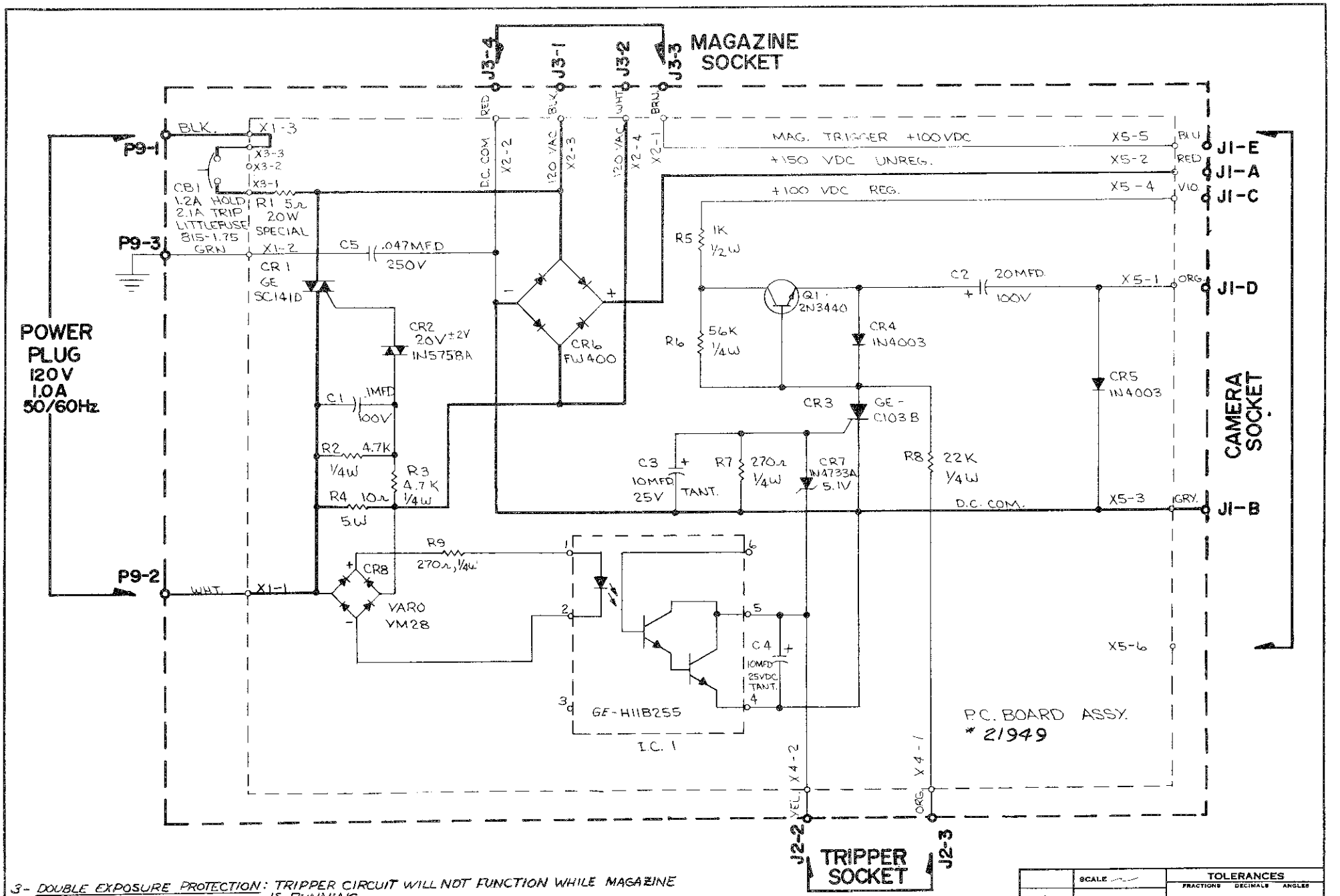
E.C.O.	DESCRIPTION	BY	DATE



A	2206	ADD CR1, IN4003 DIODE	5-24-78
	E.C.O.	DESCRIPTION	BY / DATE

	SCALE —	TOLERANCES: FRACTIONS, DECIMALS, ANGLES
31797	DATE 11-2-76	
NEXT ASS'Y	DRAWN C.G.B.	CHK'D. JPB
TITLE	SCHEMATIC DIAGRAM ~ POSE I.D. ASSY # 31797	
FINISH		
MACHINE	SLR CAMERA II	SIZE D
DRAWING NO.	31863	

31863



3- DOUBLE EXPOSURE PROTECTION: TRIPPER CIRCUIT WILL NOT FUNCTION WHILE MAGAZINE IS RUNNING.

2 - MAGAZINE INTERLOCK: POWER BOX WILL NOT FUNCTION UNLESS MAGAZINE IS PLUGGED INTO POWER BOX.

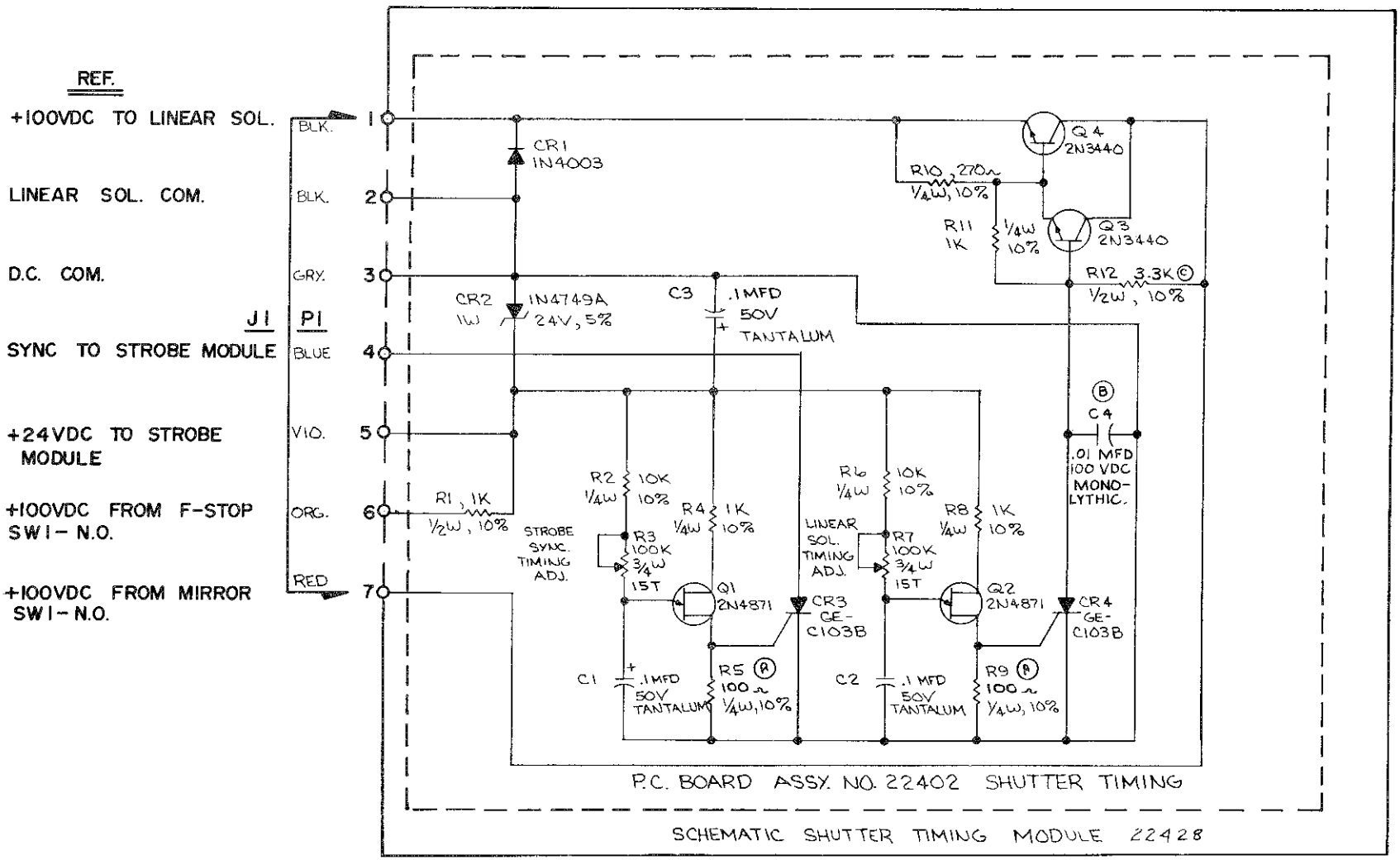
1 - CR3 SORTED FOR HOLDING CURRENT OF 4.0-6.5 MA. WITH 270 OHM GATE RESISTOR (SEE T.F-1060)

NOTES:

E.C.O.	DESCRIPTION	BY	DATE
D 2198	ADDED NOTES 2 & 3 (P.C. BOARD ASS'y No.	RWD	5-15-78
2051	REDRAWN - ADDED DBL EXP. PROTECTION CKT.		7-26-77

	SCALE —	TOLERANCES FRACTIONS DECIMALS ANGLES	
31922	DATE 7-26-77		
NEXT ASS'Y	DRAWN	CHK'D.	
TITLE	SCHEMATIC DIAGRAM 120V		
MATERIAL	POWER BOX		
FINISH			
MACHINE	MOD II CAMERA	SIZE D	DRAWING NO. 31967

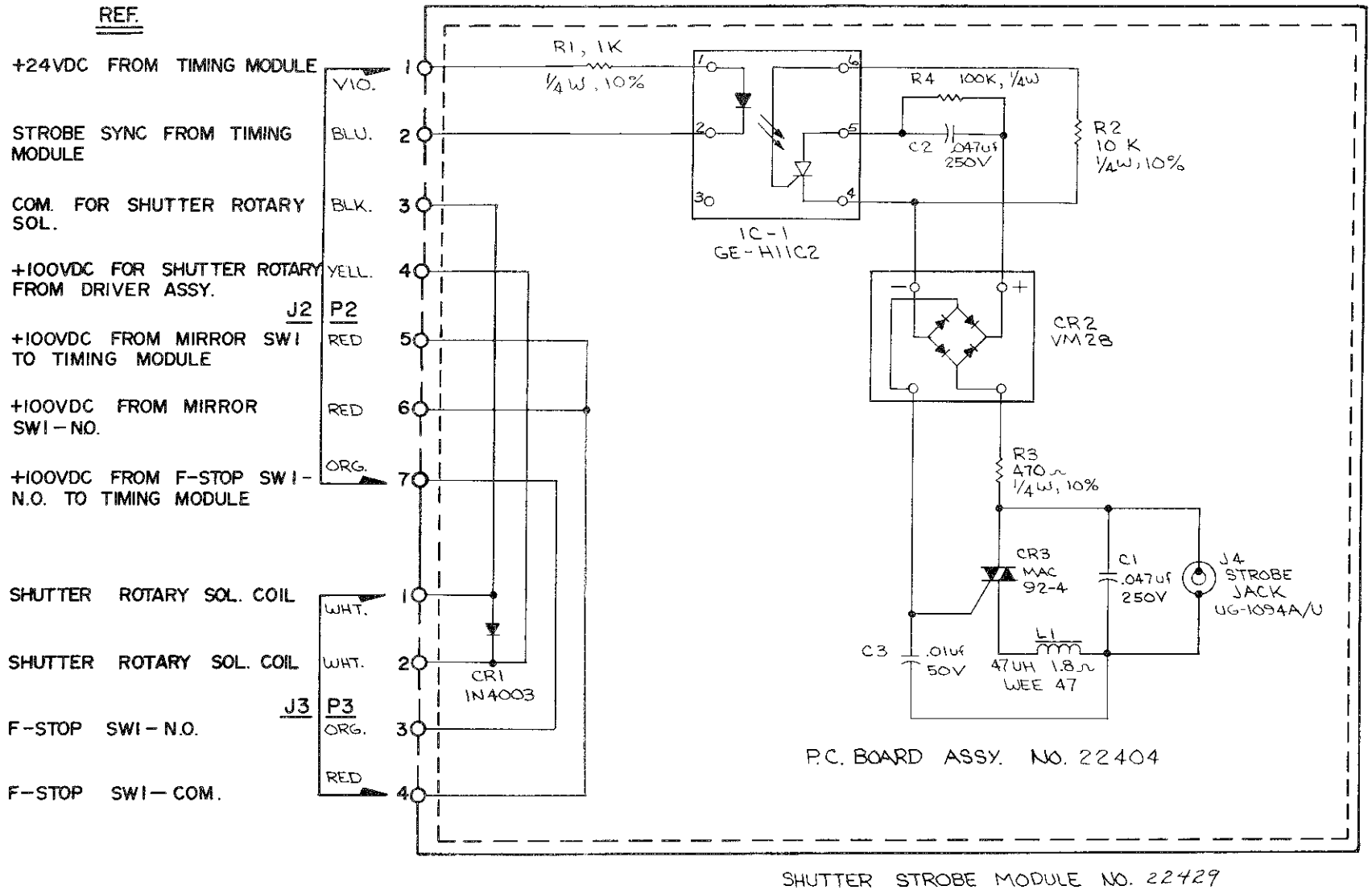
DRAWING NO. 31967



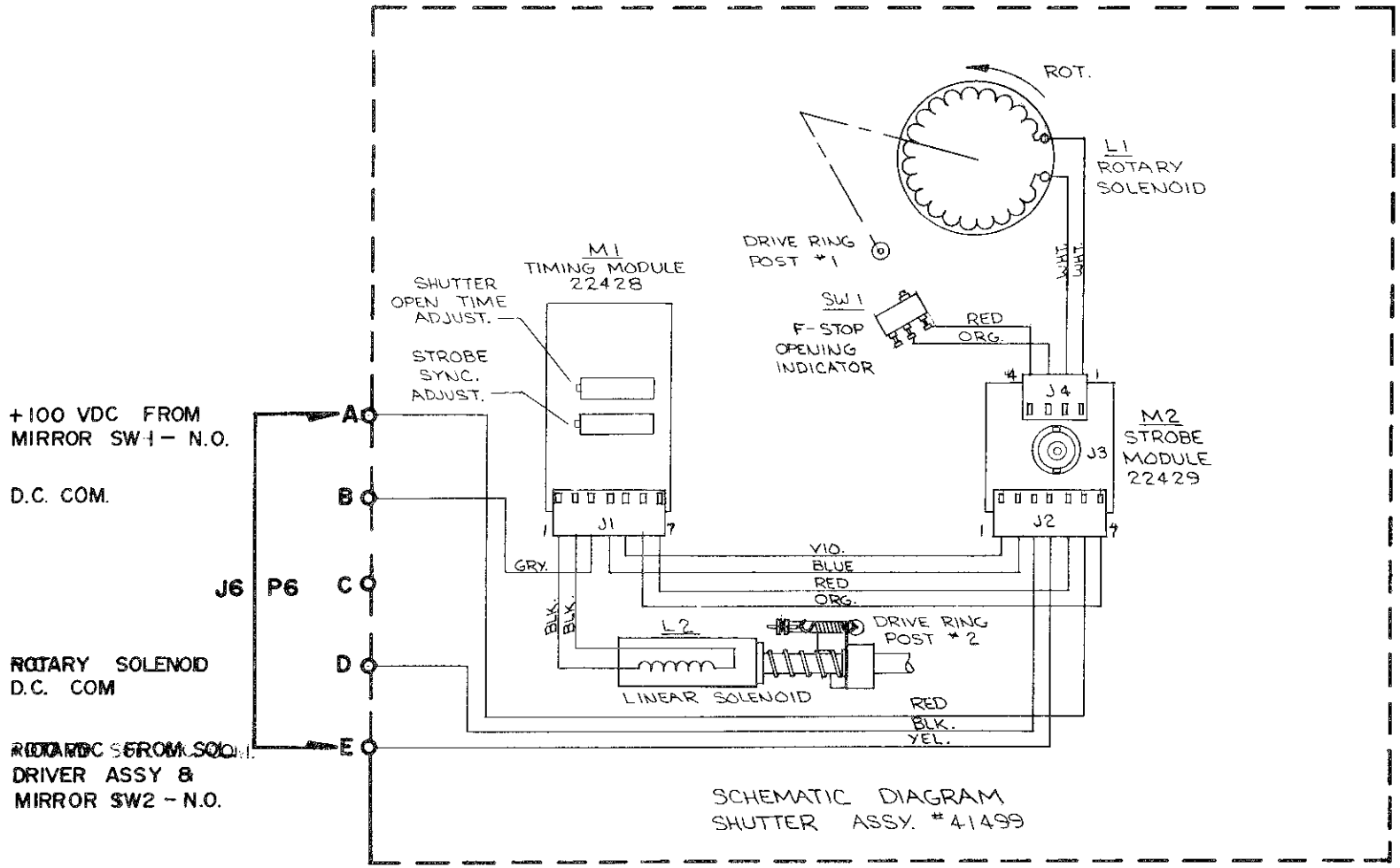
C	2194	R12 WAS 4.7K	RWD	5-19-78
B	1980	ADDED C4	LM	12-5-77
–	1882	R5 100Ω WAS 150Ω, R9 100Ω WAS 150Ω	DR	9-12-77
E.C.O.		DESCRIPTION	BY	DATE

	SCALE —	TOLERANCES: FRACTIONS, DECIMALS, ANGLES
22428	DATE 4-1-77	
NEXT ASS'Y	DRAWN C.L.F.	CHK'D. JPB
TITLE	SCHEMATIC DIAGRAM SHUTTER TIMING MODULE	
MATERIAL		
FINISH		
MACHINE	SLR CAMERA	N / D
DRAWING NO.	32100	

32100



				SCALE	TOLERANCES FRACTIONS DECIMALS ANGLES
				22429 DATE 3-31-77	
				NEXT ASS'Y DRAWN CLZ	CHK'D. JPB
				TITLE SCHEMATIC DIAGRAM SHUTTER	
				MATERIAL STROBE MODULE	
				FINISH	
E.C.O.	DESCRIPTION	BY	DATE	MACHINE SLR CAMERA	N. D DRAWING NO. 32101



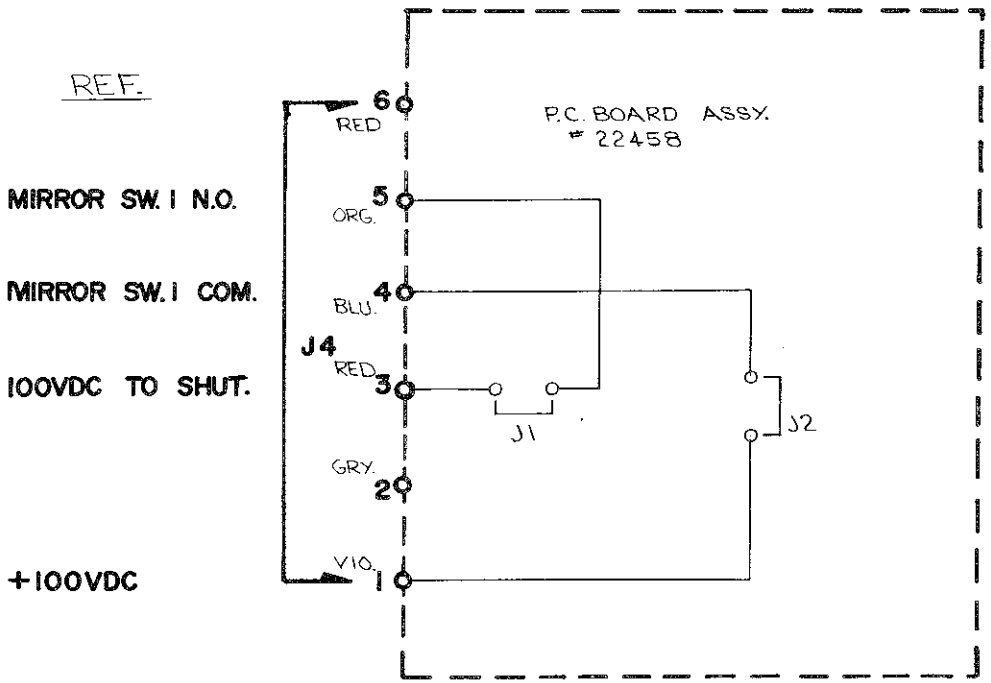
SCHEMATIC DIAGRAM
SHUTTER ASSY. #41499

NOTES:
1 - ALL WIRES ARE 24 GA. U/L FR-1.
2 - REF. SCHEMATICS #32100 AND #32101
3 - TIMING MODULE CONTROLS ARE ONLY FOR FACTORY CALIBRATION WITH PHOTO BEAM TEST FIXTURE #TF-1061 AND OSCILLISOPE.

			SCALE	TOLERANCES: FRACTIONS, DECIMALS, ANGLES
			DATE 6-23-77	
			NEXT ASS'Y	DRAWN C.L.Z. CHK'D.
			TITLE SCHEMATIC DIAGRAM - SHUTTER ASSY. 41459	
			FINISH	
			MACHINE MODEL 201 SHUTTER	N
				DRAWING NO. 32162
/	E.C.O.	DESCRIPTION	BY	DATE

32162

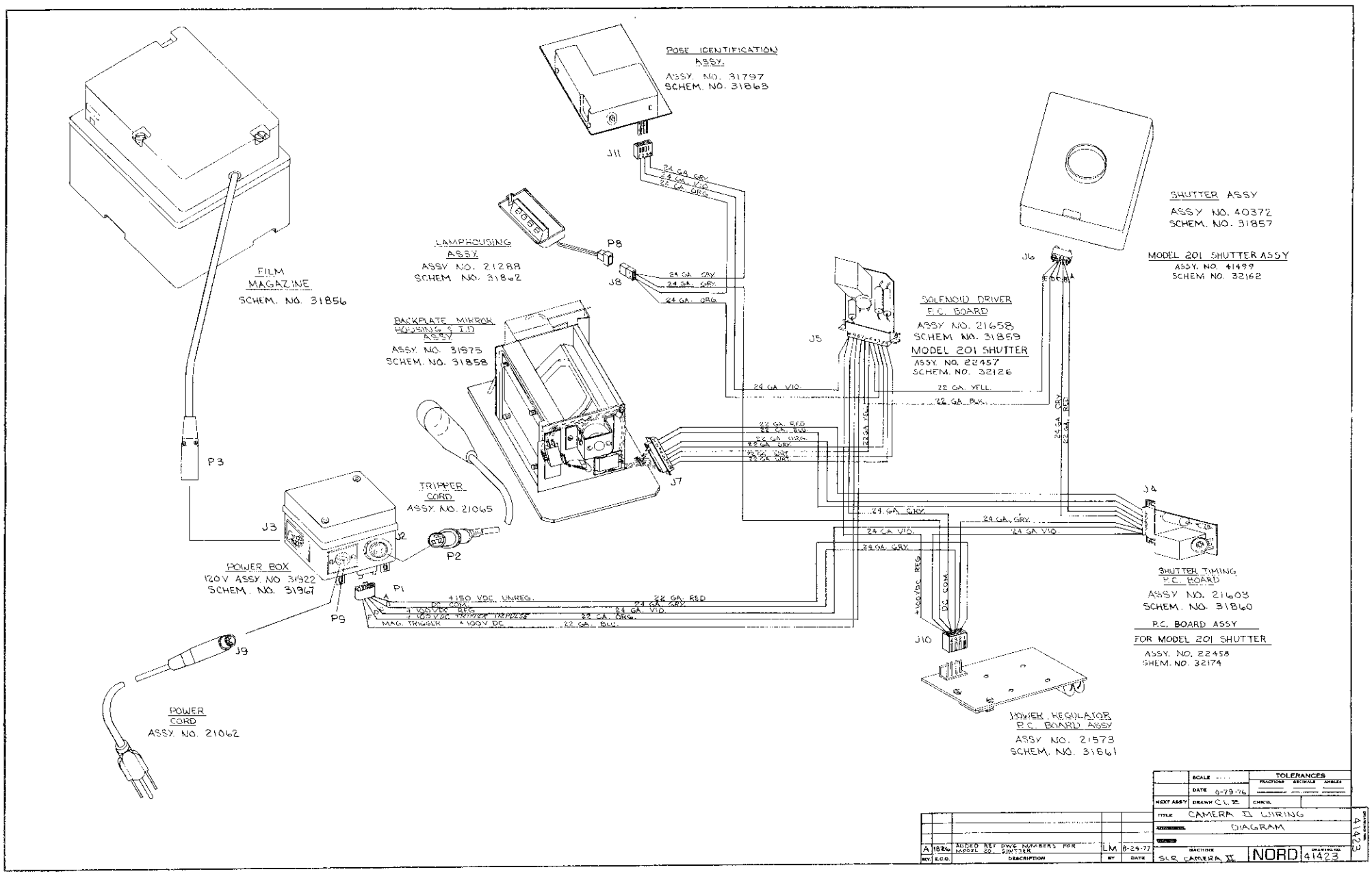
REF.



EV.	E.C.O.	DESCRIPTION	BY	DATE	

	SCALE —	TOLERANCES FRACTIONS DECIMALS ANGLES
22458	DATE 7-25-77	
NEXT ASS'Y	DRAWN CLL	CHK'D. JB
TITLE	SCHEMATIC DIAGRAM	
MATERIAL	P.C. BOARD ASSY.	
FINISH		
MACHINE	CAMERA	DRAWING NO. 32174

32174


POSE IDENTIFICATION ASSY.
ASSY. NO. 31797
SCHEM. NO. 31863
J11
24 GA. GRY
24 GA. VIO
22 GA. ORG
LAMPHOUSING ASSY
ASSY NO. 21288
SCHEM. NO. 31862
P8
J8
24 GA. GRY
24 GA. GRY
24 GA. ORG
FILM MAGAZINE
SCHEM. NO. 31856
BACKPLATE MIRROR HOUSING & I.D. ASSY
ASSY. NO. 31975
SCHEM. NO. 31858
SHUTTER ASSY
ASSY NO. 40372
SCHEM. NO. 31857
MODEL 201 SHUTTER ASSY
ASSY. NO. 41499
SCHEM. NO. 32162
J6
SOLENOID DRIVER P.C. BOARD
ASSY NO. 21658
SCHEM. NO. 31859
MODEL 201 SHUTTER
ASSY. NO. 22457
SCHEM. NO. 32126
J5
24 GA. VIO.
22 GA. YELL.
22 GA. BLK.
22 GA. RED
22 GA. BLU
22 GA. ORG.
22 GA. GRY
22 GA. WHT
22 GA. WHT
22 GA. VIO
24 GA. GRY
22 GA. RED
P3
TRIPPER CORD
ASSY. NO. 21065
J7
J4
J3
J2
P2
POWER BOX
120 V ASSY. NO. 31922
SCHEM. NO. 31967
24 GA. GRY
24 GA. GRY
24 GA. VIO
24 GA. VIO
24 GA. GRY
P1
P9
+150 VDC UNREG.
22 GA. RED
DC COM.
24 GA. GRY
+100 VDC REG.
24 GA. VIO
+100 VDC TRIPPER PULSE
22 GA. ORG.
MAG. TRIGGER +100 V DC
22 GA. BLU.
+100 VDC REG.
DC COM.
J10
J9
POWER CORD
ASSY. NO. 21062
POWER REGULATOR P.C. BOARD ASSY
ASSY NO. 21573
SCHEM. NO. 31861
SHUTTER TIMING P.C. BOARD
ASSY NO. 21603
SCHEM. NO. 31860
P.C. BOARD ASSY FOR MODEL 201 SHUTTER
ASSY. NO. 22458
SHEM. NO. 32174
A 1826 ADDED REF DWG NUMBERS FOR MODEL 201 SHUTTER LM 8-24-77
REV. E.C.O. DESCRIPTION BY DATE
SCALE
TOLERANCES
FRACTIONS DECIMALS ANGLES
DATE 6-29-76
NEXT ASSY DRAWN C.L.E. CHK'D.
TITLE CAMERA II WIRING DIAGRAM
MACHINE SLR CAMERA II
NORD
DRAWING NO. 41423
A 41423